

# The Chemical Age

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**NOTICES.**—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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## The Art of Importing Chemicals

AMONG chemical merchants a good deal is heard just now about the methods and conditions under which foreign chemicals, especially German, are being put on the British market. It is freely suggested that private arrangements are being offered to prospective buyers to enable them to evade payment of the full duty and so to obtain an advantage over the dealer who imports on the normal terms. The Customs authorities, no doubt, had something of this in view when they proposed, instead of accepting the value of goods as stated in the invoices, to substitute for duty purposes the actual market value in this country as determined by their own officials. To this course, the Chemical Traders' Association offered strong objection, and with some amount of reason. An invoice is supposed to be a responsible *bona fide* record of the price at which the exporter sells to the importer, and it should be accepted as the basis on which duty is payable. If, on the contrary, the invoice value is ignored, and the importer has to pay on the current market value as fixed by the Customs officials, and possibly appreciably higher than the actual price paid, the margin on which he trades would be a constantly varying quantity, and a troublesome uncertainty would be introduced into his business. The argument seems to us quite sound, so long as the invoice can be

accepted as a genuine document. If, however, it becomes known or there is serious reason to suspect that the invoice price is a fictitious figure, put in by the exporter under an arrangement with the importer to evade payment of the full duty, then the Customs authorities are entitled to take firm steps to prevent the evasion.

So far, we think, the organised merchant class would agree. For if the invoice is in any degree a "faked" document, not only does the country lose revenue to which it is entitled, but the importer who adheres to the correct procedure is handicapped in comparison with the importer who resorts to tricks in the fixation of values, and the whole business of import trade comes under suspicion. The evil is recognised, but how it is to be met is not quite so clear. If the Customs authorities are to set their own value on each consignment, the importer, who bought cheaply, as he is quite entitled to do, might be penalised by having to pay duty on a higher figure than the actual purchase price. In addition, working, as many importers do, on a fine margin he might have a fair business gain converted into a loss. This would be distinctly unjust and would seriously hamper trade. And yet, if invoices cannot be trusted, some other method must be found of fixing the fair value for duty purposes. A proposal is made that the Customs authorities and the chemical traders' organisation should mutually fix the figure on which the various imported chemical products should be assessed for Customs duty over a definite period. This would place all importers, in the matter of duty, on a common level, and each would know, whatever the price he paid, the exact amount of duty he was liable for. The free-lance type of importer would probably object, but the plan indicates one way of equalising and stabilising the conditions of importation for all importing houses.

Instances have been reported to us which seem to show the need of establishing some stricter standard in the chemical trade. There is nothing apparently to prevent a German or other foreign firm supplying goods to a branch of the firm in this country or to an independent importer at cost price, or indeed at any price, so long as it is the actual price paid. But if, supplying goods in the first instance at an uneconomic price, the exporter counts on being repaid later in the shape of part profits or in any other indirect form, it seems to us that the indirect price should be as much liable to duty as the direct price declared in the invoice. In other words, the whole return, direct and indirect, which the exporter gets for his goods should be treated as the dutiable price. This, however, is a matter for our experts in company law. There are, of course, obvious direct ways of evading payment of duty, if the parties conspire together for the purpose. If—to take a hypothetical case—a "tout" for a

foreign firm approaches a British importer respecting chemical goods to the value of £100, and suggests that if the latter pays £25 in cash the goods will be priced in the invoice at £75, the importer, by accepting such an offer, escapes the payment of duty on £25, and that advantage may just enable him to undercut the genuine importer, who pays on the full £100. One can hardly believe that so risky and disreputable a practice can prevail to any extent, but the chemical trade is suspicious on the point, and it is clear that the Customs authorities' faith in the trustworthiness of the invoice is not as implicit to-day as it once was.

### The Future of the Nitrogen Market

WHAT has been, and will be, the effect of the production of synthetic ammonia and nitrates upon the world's nitrogen markets? The evidence of the past few years does not lead us very far in any attempt to forecast the future, and those who would appear to be in a position to form the most trustworthy opinions have been singularly reticent in predicting what may happen to the natural products when once synthesis is conducted on a really intensive scale. We have lately been reading a more than usually interesting summary of recent progress which has been contributed to one of our Canadian contemporaries by Dr. L. F. Goodwin, of Queen's University, Kingston. After sketching the principal lines of development in all those synthetic processes which have shown themselves to possess claims to practicability, Dr. Goodwin reminds us that the price of nitrogen in fertilisers (whether in the form of sodium nitrate, ammonium sulphate, or synthetic ammonia and nitrates) has been fixed in the past by the price prevailing for Chilean saltpetre. Such a comparison is absolute, and the view is expressed that such a situation is likely to continue for a number of years.

Coming to figures, it is found that of an annual production of 2,660,000 tons of Chilean nitrate in 1913, Germany consumed nearly 650,000 tons, and the United States rather less. Owing to the enormous scale on which the Haber process was developed during the war, Germany as a consumer has practically disappeared from the world's market. This is in spite of the fact that her pre-war consumption was between 600-800,000 tons a year, which indicates that (taking Chilean nitrate at its pre-war figure of £10 per ton) the Haber-Bosch process is worth about £7,000,000 a year to Germany, while it must be remembered that she has not yet started to export, unless the diminished consumption lately shown by Holland and Belgium, so far as natural products are concerned, is to be taken as an indication that those countries have been purchasing from Germany. Dr. Goodwin appears confident that as regards the general world situation there is bound to be a greatly increased consumption of nitrogen, more particularly in those countries where the yield per acre is low. As regards the importance, so far as output is concerned, of the various substances, by-product ammonia comes next in order to Chilean nitrate; and as this by-product ammonia must necessarily be disposed of, its price will be governed by that of nitrate, however much the price of the latter may fall. It must not be forgotten, moreover, that at the economic limit of production for nitrate, by-

product ammonia can still be sold at a profit. As a general axiom, Dr. Goodwin gives the opinion that the production of cyanamide is likely to decrease, and the increase in the world's demands for fixed nitrogen will be met largely by synthetic ammonia and nitrates. Hence, until the production of these latter overtakes the consumption of Chile saltpetre, the price of nitrogen in the Chilean product will fix the world's price for nitrogen in general. Perhaps, however, the most pertinent question of all is—At what price can synthetic ammonia be produced? It would seem that at the moment the question cannot be conclusively answered.

### The 26 Per Cent. Duty

IN reference to inquiries which reach us from chemical importing firms respecting the effect of the proposed increase in the German reparations levy from 5 to 26 per cent., we believe the present position is fairly clear. The levy of 5 per cent. will continue in force until the conditions contained in the Dawes report come into general operation, and then, when it is decided to restore the 26 per cent. duty, due notice of the change will be given. It is thought probable that the new rate may come into force during September, but this will depend on the undertaking of the German Government to reimburse their nationals in cash the full amount of the British Customs receipts immediately they are presented. It was the German Government's failure to do this when the levy was originally in force which led to its reduction to 5 per cent. The British Government, it is understood, are clearly informed as to the position of the British importer, and show every disposition to protect his interests. Any change in the amount of the levy will become operative on and from a certain date, and German goods landed in this country on or after that date will be liable to the new duty, without regard to the dates on which the contracts were made. It might be advisable, therefore, when chemical importers are placing orders with German firms, to stipulate that payment will be made according to the amount of reparation levy in force on the date the goods arrive here. In practice the working of the 26 per cent. duty should be quite simple. Assuming the British importer to have purchased German goods of the total value of £100, he will pay £26 direct to the British Customs, and the balance of £74 to the German exporter, together with his Customs receipt for £26. The latter document should enable the exporter to obtain the £26 from the German Government, and the working of the scheme depends on this undertaking being carried out.

### The End of Part II

AFTER running for a period of three years Part II of the Safeguarding of Industries Act came to an end on August 19, and as the Government had decided not to extend the period that portion of the measure of 1921 is no longer operative. This is the second of the protective measures introduced by Liberal or Coalition Ministries which the present Labour Government has removed, the first being the McKenna duties of 1915 on motor cars, motor cycles, and other articles of foreign manufacture. The first attempt to embody in legislation the decisions of the Paris Conference of

1916 was made in 1918, when the Non-Ferrous Metals Act was passed, requiring companies engaged in wholesale businesses to be licensed by the Board of Trade. The second measure was the Dyestuffs (Import Regulations) Act of 1920, which prohibits the importation of dyestuffs except under licence. The third was the Safeguarding of Industries Act of 1921. Part I of this Act is of first-rate interest to the chemical industry, since it was designed to protect the fine chemical industry by imposing a duty of 33½ per cent. on synthetic organic chemicals and other substances. These duties are to remain in force for five years from October 1, 1921. Part II, which is now inoperative, was designed to protect British industries against dumping and other unfair conditions of competition by the imposition of a duty of 33½ per cent., but though a considerable number of cases were reported to the Board of Trade, we believe that only two actual orders were made under the Act. The first dealt with fabric gloves, glassware, and aluminium ware; the second related to gas mantles. In each case the orders applied only to goods manufactured in Germany. It will thus be seen that the lapse of Part II has only a very slight effect on the chemical industry.

### The European Peace Treaty

THE London Agreement, concluded last week-end by representatives of the Allied Governments and of Germany, is by no means the end of European troubles. But it does mark, it is to be hoped, the new starting point towards European peace and industry for which we had hitherto looked in vain. Among no class will the settlement be more welcomed than among business men, for, as the United States Ambassador remarked truly, "there must be friendly intercourse, exchange of products, and revival of industry if Europe is to be prosperous and her people happy." The terms have been agreed to in course of negotiation, and the representatives of all the countries concerned have pledged themselves to work honestly to carry them out. Within a short period Great Britain's first Labour Prime Minister has concluded agreements with two great nations which, remaining unsettled and disaffected, must be the storm centres of Europe. These settlements have been represented as surrenders to all kinds of unworthy influences, but they carry with them the goodwill of the majority of the nation. For while Germany's future was uncertain there was no possibility of real commercial security in Europe, and while Russia is isolated Europe loses the advantage of trade with a country of untold resources. It may mean some further sacrifice to help to set these nations once more on their feet, but it is through brave and generous things of this sort that Great Britain has won its place on the earth, and the ultimate reward comes in the shape of the confidence and respect of other nations.

### Chemical Trade in July

THE general trade of the country underwent something of an upward surge during July, which was markedly reflected in the figures for the exports and imports of chemicals and allied substances. The total value of imports was £1,146,000, which represented an increase of over £37,000 on the previous month, and

nearly £353,000 more than the corresponding month last year. Exports once again passed the two million mark, being valued at £2,207,000, which was an increase of over £300,000 on the June figures, and £468,000 more than July of last year. The chief items in the imports which have led to the increase are those under the headings of bleaching materials, calcium carbide, and sodium compounds, except sodium nitrate. The nitrate shows only a slight increase. Barytes, white lead, painters' materials and essential oils have also been imported in considerably increased quantities. Considerable interest attaches to several items appearing in the export figures. For example, sulphuric acid jumped up again, nearly 3,000 cwt. being exported compared with just under 2,000 cwt. in July, 1923. The sulphate of ammonia total is practically unchanged, but actually France, Spain and the Canaries took greatly increased amounts, while Japan imported only 400 cwt. as against over 8,000 cwt. from this country last year in July. Various coal tar crudes showed an increase on the whole, mainly due to tar oil and creosote exports. Sodium and potassium compounds, with the exception of saltcake, are also largely increased. The figures for synthetic coal tar dyestuffs, however, underwent a decline, being only 9,516 cwt. against 15,023 cwt. in July, 1923, and 3,668 cwt. in July, 1922. There are numerous indications that the increased export demand for these products, which was a notable feature of last year's overseas trade, is now temporarily at an end. On the other hand, however, the position of the export trade in manufactured chemicals generally is slightly on the up-grade.

### Points from Our News Pages

An article by Mr. Rex Furness deals with the problem of explosion risks in handling, not only inflammable substances, but also those commonly regarded as safe (p. 184). A review of the British chemical trade is taken from the *European Commercial* (p. 186). Mr. D. Bronnert gives a short historical sketch of the natural and artificial silk industries (p. 188). The Board of Trade returns for July show increases in both chemical exports and chemical imports (p. 189). Letters are published from Mr. I. Boodson (British Association of Chemists) and Mr. R. S. Hale of Boston, U.S.A. (p. 190). The sulphate of ammonia market maintains its former tendency. The new prices of neutral sulphate are £14 2s. for September and £14 4s. for October delivery (p. 199). Trade in heavy chemicals in the London and Scottish markets continues quiet, without any change of importance (p. 199).

### Book Received

HANDBOOK TO THE EXHIBITION OF PURE SCIENCE, ARRANGED BY THE ROYAL SOCIETY. London: the Royal Society (obtainable from A. and F. Denny, Ltd., 163, Strand, W.C.2). Pp. 228. Price 1s.

### The Calendar

Sept 4-5	Iron and Steel Institute Autumn Meeting	British Empire Exhibition, Wembley
8-11	Institute of Metals	London
8-13	Chemists' Exhibition	Manchester
Oct 7	West Yorkshire Metallurgical Society Annual General Meeting, 7.30 p.m.	George Hotel, Huddersfield.
Nov 4	West Yorkshire Metallurgical Society Discussion on "The Influence of Casting Temperatures on the Physical Properties of Non-ferrous Alloys." 7.30 p.m.	George Hotel, Huddersfield.
14	Society of Chemical Industry: Annual Autumn Dinner	London

## The Explosion Hazard in Industry

By Rex Furness

*In the following article Mr. Rex Furness reviews the problem of preventing explosions in industry, not only when dealing with inflammable materials, but when substances normally regarded as being safe are being handled in a finely divided state which may render them liable to "dust" explosion.*

THE explosion hazard in industry is unfortunately not confined to the manufacture of those materials which are commonly regarded as dangerous. Since our first industrial dust explosion to attract widespread attention in 1911, "unexpected" explosions have occurred with too distressing a frequency; and with the recent reminders in the shape of the report of the investigation into the causes of the Oppau disaster and the death-dealing explosions in the starch works at Pekin, Illinois, and at Nixon, New Jersey, where ammonium nitrate was being recovered from its mixture with T.N.T., it behoves us to pause and consider whether familiarity is not breeding too easy a contempt of potential danger.

Even if we exclude explosions occurring in munitions factories, especially in the conditions often ruling during war time, there have been enough explosions in industrial operations in the past decade to bring safety measures into prominence; and although the ever-present danger will be stressed in this article, it must not be thought that causes and preventive measures are not understood, nor should the writer be set down as a prophet of woe. On the other hand, it is the height of folly to fail to realise that the risk does exist in many industrial operations, or, realising the risk, to fail to take precautionary measures which are almost certain to assure perfect safety.

For the sake of convenience, the subject will be divided into a consideration of (1) explosions occurring in the manufacture of certain organic chemicals, where the risk is usually pretty well realised and allowed for, (2) those occurring or liable to occur in the manufacture of inflammable dusts which are always a potential source of danger in the manufacture of sugar, starch, organic products, metallic dusts, as well as in saw mills, textile mills, oil cake mills, etc., and finally (3) those possible of occurrence in air liquefaction plants. It will thus be seen that coal dust explosions in mines will be excluded from consideration, whilst the hazards in the making of those substances commonly classed as explosives are also passed over with a mere reference.

It is a matter of relative simplicity to ensure safety in the first and third classes of manufacture noted above, for not only are the potential dangers understood and the means of avoiding dangerous conditions reasonably well known, but also the fact that there is possible danger is kept, by the nature of things, more in the minds of operator and manager, and more or less strict rules are formulated and observed—again more or less satisfactorily. It takes a deal of persuasion, however, to convince the ordinary working man, or, indeed for that matter, many responsible managers, that sugar, starch, aluminium powder, flour, grain, and such like inoffensive and everyday articles can play the part of the demon in the piece with no inconsiderable success. It requires a combination of circumstances to promote disaster, but the potential danger is there and should be recognised.

### Explosions in Chemical Works

It is clear to every chemist that explosive mixtures of air and solvent vapours, gases such as hydrogen, water gas and the like, are dangerous, and it is rare that necessary precautions are not taken, and although the strictest instructions and watchfulness will often fail to prevent workmen from committing absurd actions—such as smoking in a solvent still room—it is satisfactory to be able to report comparatively little loss of life in such cases. Supervision in all types of gas plants, solvent extraction plants, fabric coating factories, and in working with compressed gases, particularly perhaps acetylene for welding purposes, etc., and endothermic substances, etc., should always be of the strictest.

The conversion of acetaldehyde to acetic acid by means of oxygen or air, in the presence of a catalyst such as manganous acetate, is a process which is unfortunately notorious as having killed men in many countries in both Europe and America. The heat evolved is great and acetaldehyde is, of course, very volatile and inflammable, whilst the production of an extremely

unstable per-acetic acid is possible. Danger can, however, be avoided by a careful control over the exit gases from the converter. The latter should always be charged with aldehyde in the presence of an inert gas such as carbon dioxide or nitrogen, and the flow of air during the oxidation process should always be so regulated that oxygen does not appear in the exit gases, except, perhaps, in small concentrations towards the end of the reaction when the converter contains little aldehyde in the acetic acid-aldehyde mixture. The nitrogen passing from the converter during the initial stages of the reaction can conveniently be collected and made use of as the inert gas referred to above.

An explosion has occurred in an antipyrine factory, due to the sudden volatilisation of a mixture of acetic anhydride and alcohol under the catalytic influence of sulphuric acid.

Other explosions have taken place due to the detonation of endothermic substances, to the infiltration of air into *o* and *P* nitro toluene plant, etc., whilst diphenyl ethylene has spontaneously detonated, causing serious loss, in oxygen at 100 atmospheres.

In addition to explosions which have actually occurred such as those noted above, there have been many minor affairs, and it is unnecessary to elaborate further upon this phase of the matter. The chemist knows of the possible dangerous circumstances and takes all due precautions.

The negative findings of all who have attempted to throw light upon the causes of the Oppau disaster have been arrived at after long investigation, and it is probable that we shall never solve the mystery. The work has, however, thrown considerable light upon the question of the explosive nature of ammonium nitrate. Under certain circumstances of packing and detonation, this chemical can be exploded, although in the ordinary course of events one is not justified in ranking it as a dangerous chemical. In association with organic materials, carbon, etc., the hazard is increased, and especially when ammonium nitrate is being recovered from explosives no longer required—ammonium nitrate constituted 80 per cent. of the high explosive Amatol, 4,000 tons per week of which were made in this country alone at one period of the war—the greatest precautions are necessary. The report of the commission of inquiry into the cause of the explosion at Nixon, New Jersey, will no doubt emphasise this point.

### Dust Explosions

In spite of the fact that dust explosions occur with comparative frequency, there is still a disposition to treat the peril lightly. This is particularly the case in this country, which, fortunately, has not had the number of appalling experiences which have fallen to the lot of the United States. Organic dusts, such as sugar, starch, wood, cereals, etc., as well as sulphur, and finely divided metals, such as aluminium powder, possess a very large surface, and when suspended in air in concentrations embraced by wide limits they form systems which can readily be ignited, and what is worse, once ignited may burn with explosive violence.

Wheeler, who investigated the causes of the 1911 Liverpool explosion, divided dusts into three broad classes, namely:

1. Those which ignite and propagate flame readily. A small source of ignition only is requisite; for instance, a lighted match, an electric spark, etc. The substances in this class, such as sugar, starch, cocoa, rice, cork, wood flour, malt dust, etc., possess the lowest ignition temperatures of all dusts. Thus a sugar cloud, for example, will ignite at 540° C.
2. The second class includes those dusts which are readily ignited but which require a source of heat for the propagation of the explosive wave. The explosion can, therefore, be initiated by a source of heat of large size or relatively long duration—for instance, a bunsen burner, an electric arc, etc. As examples of this class may be given leather dusts, mustard, certain gum resins, certain oil cake dusts,

3. Those dusts which are not capable of propagating the explosion wave under ordinary circumstances are classified in

this section. Substances containing a variable amount of ash, etc., may fall into this class, but examples are not given here, as circumstances may bring a material of class 3, ordinarily not capable of propagating the explosive wave, into a higher class.

It will thus be clear that many apparently inoffensive materials may, in certain circumstances, constitute real dangers. This is due to the fact that in such cases a large surface of combustible matter is exposed to the supporter of combustion—namely, air. Thus, one would find difficulty in setting fire to THE CHEMICAL AGE if the copy were rolled up tightly, whereas a single sheet could easily be set alight.

In addition to the effect of fineness of division upon the increase of surface in contact with the surrounding air, the particles are closer together, as it were, when in extreme fine division. The ideal case, of course, is that of a combustible gas and air, mixed in the reacting proportions. Here the division and contact are molecular and the violence of the explosion is at a maximum. Many dusts are approaching, although still far removed from, the state of molecular contact and the violence of a dust explosion, *ceteris paribus*, increases with the fineness of division of the material. This is quite comprehensible if we consider broadly the way of an explosion. The section of the explosive mixture, gaseous or air-dust system, immediately in contact with the source of ignition naturally fires and evolves a greater or smaller amount of heat. This heat may be dispersed in several ways. If it is radiated to a surrounding inert atmosphere or to the walls of a containing vessel, etc., the fire ceases more or less instantaneously. If, on the other hand, the heat is passed on to adjacent molecules of air and combustible gas or dust in sufficient intensity and amount to raise the latter to the ignition temperature, the initial ignition will effect the firing of parts of the explosive mixture not directly in contact with it, and the flame or explosion wave will be propagated. \* Hence, the finer the dust and the nearer together the particles, the greater is the opportunity for the preservation of the heat within the system and the propagation of the explosion from particle to particle. The influence of water vapour or water contained within the dust upon limiting or preventing explosion will be realised too, for it "damps down" the explosion by reason of the heat absorbed, together with, in the case of water containing dusts, the heat of vaporisation.

As in the case of gas explosions, there is an optimum condition of dust concentration, and upper and lower limits exist outside of which explosions cannot occur. The concentrations cannot be set with the same exactitude as in the cases of gas or solvent vapour and air explosions, as the fineness of division of the dust, the content of inert material, humidity, etc., are variable factors. Still a broad idea may be arrived at. Thus, a certain starch dust gave an explosive mixture with air when present in the proportion of about a quarter of an ounce to one cubic foot of air. Again, as illustrative of the limits within which coal dust and air will explode, a certain powdered coal exploded when dusted into air in all concentrations between about one-fortieth and one-eighth ounce per cubic foot, and the latter concentration did not represent the upper limit of coal dust.

Dusts of many varieties are, then, produced in industry, many of them are readily ignited even by an electric spark and the concentrations in air which are dangerous, although subject to some variation according to conditions, lie between wide limits. The chance of disaster is often great, and it is incumbent upon chemists and managers to take all safety measures which are possible.

#### Precautionary Measures

It is impossible to describe in short space the safety measures which may be taken. A few of the more obvious and more general may be indicated. If, however, the sketch of the manner and cause of dust explosions has served to emphasise the possibility of danger whenever organic or easily oxidisable dusts are being produced, the natural result will follow, namely, that anyone who is directly concerned and who may not have fully considered the matter in the past will consult the many full publications which are available and which can readily be obtained.

The method which has met with success in the case of coal dust explosions in mines, namely, the damping down of the explosion by means of inert dusts—stone dust, limestone, etc.,

—which are incombustible and are discharged into the dust-air mixture in such concentration as to prevent further propagation of the explosive wave, is usually quite impracticable in industry, where, in general, the products must not be contaminated. This method will therefore be dismissed at once here. It is, however, relatively simple in many instances to damp down the mixture, or rather bring it below the minimum oxygen concentration for explosion, by introducing into the disintegrating mill, conveyor, elevator or the like, an inert gas such as carbon dioxide, much in the same way as was done in the case described of acetaldehyde conversion to acetic acid. Special furnaces consuming coke are available wherein carbon dioxide and nitrogen can be generated at a cost of around a penny per thousand cubic feet. The primary and secondary units, scrubbers, gasholder pipes, valves, connections, etc., are conveniently placed, and the apparatus is easily worked, sure in action and inexpensive. In many instances, the introduction of as little as 25 per cent. of the volume of the mill, elevator, etc., will effectively prevent ignition of combustible dusts by means of a spark. The purity of the gas is such as to prevent contamination of the product of manufacture.

This method of introducing an inert gas is often capable of easy installation in connection with enclosed disintegrators, mills, conveyors, tight-housed elevators, and so forth, and has proved its efficacy in practice.

In addition, there are several elementary precautions which must be taken. Dust should never be allowed to accumulate upon walls, etc., and regular cleaning by suction apparatus should be the rule. Conveyors, mills, etc., should always be enclosed when at all possible, and dust clouded atmospheres in any type of apparatus should never be discharged without passage through a filter, the fan, of course, being placed after the filter.

In grinding apparatus, etc., the moving parts should never be allowed to overheat by friction. Careful control over lubrication is essential, and metallic nails, etc., must never be present as impurities in the material undergoing disintegration. The recent disaster in the starch mill in America was traced to an overheated bearing of a screw conveyor, which ignited the wooden housing and eventually the dust-laden air. In this particular factory there was a staff of safety engineers, and yet explosion occurred. This should serve to emphasise still further the potential danger which exists in all factories dealing with organic or easily oxidisable substances in fine division. Had the composition of the atmosphere in the starch conveyor been brought down below that corresponding to oxygen concentration for explosion, say by the use of the inert gas noted above, it is inconceivable that disaster could have happened. The use of this method should be considered carefully and installations made, even at some slight inconvenience to normal general practice. It represents a low insurance premium indeed.

The accumulation of static electricity to a point where sparking takes place should be guarded against. It is well known that petrol flowing through a hose creates sufficient frictional electricity to cause sparking and finally ignition of the petrol. Much information has been published upon this and similar questions.

#### Explosions in Air Liquefaction Plants

Several explosions have occurred in air liquefaction plants, but the origin has been traced in practically every case to the presence of acetylene in the rectifying columns, and there should be little difficulty in taking suitable precautionary measures.

Dr. Fyfe of the British Oxygen Co., and Dr. Pollitzer of the Linde Liquefaction Co., Munich, have independently arrived at the same conclusion, although they differ slightly in detail.

#### Air Taken for Liquefaction

Acetylene is often present in small quantities in the air, particularly when the air is drawn from the atmosphere over industrial towns or from the vicinity of carbide works, acetylene generators, etc. Dr. Pollitzer also considers it possible that the decomposition of the lubricating oil used in the compression cylinders may give rise to some acetylene. The point of importance is that acetylene is often present in the air sent to the liquefaction apparatus, and if this is not removed it will gradually accumulate in the rectification

column in the form of solid acetylene—since its vapour pressure is small—and in admixture with liquid oxygen, it is liable to violent explosion. The exact cause of detonation is not known in all cases, but it is clear that a careful watch for the presence of acetylene and the simple measures which are available for its complete removal from air will effectively prevent explosions in air liquefaction plants.

The cylinders of the compression apparatus must not be allowed to overheat, of course, for the lubricating oil will react vigorously with the compressed gas, even if acetylene be not produced by the thermal decomposition of the oil.

The elementary precautions which will have to be observed in pulverised coal firing installations, now that these are winning recognition in this country, are fairly well defined, and the erstwhile fear that pulverised fuel was a dangerous fuel no longer reacts against the method. Full information is, however, available in the proper quarter, and nothing further need be said at this juncture.

The explosions which did occur in the early days of pow-

dered coal firing should, however, serve to emphasise the fact of the possibility of dust explosions, and the success which has followed preventive measures is a significant proof of what can be done in this direction and marks a clear lead for all who work with combustible dusts.

[In the recently issued report of Mr. Stevenson Taylor, H.M. Chief Engineering Inspector, which was published after Mr. Furness's article was in our hands, the same trend of thought is particularly in evidence. Thus, it is stated that "the possibility of an explosion occurring through the ignition of a cloud of fine dust of any combustible material does not appear to be sufficiently realised by many occupiers and managers of factories." Twelve explosions occurred during 1923 due to the ignition of carbonaceous dusts. The report, embodied in the annual report of the Chief Inspector of Factories and Workshops, 1923, contains valuable information and analyses of the causes of the explosions.—Ed., THE CHEMICAL AGE.]

## A Review of British Chemical Industry Advances in Production and Quality

*A special supplement to the "European Commercial" of August 16, prepared in conjunction with the Association of British Chemical Manufacturers, and illustrated with excellent photographs of Sir Max Muspratt, Mr. D. Milne Watson, and Mr. W. J. U. Woolcock, contains a general review of the present position of the British chemical industry, from which the following extracts are taken.*

IN view of the enormous part which chemicals and chemistry played in the war, and of the fact that, by cutting off foreign supplies, the war served to develop the British dyestuffs industry, there is sometimes a tendency to consider the manufacture of chemicals as among the newer branches of British commercial activity. In point of fact, the case is very different. For many years British chemicals have been supplied to all parts of the world, and the present organisation of the industry is such that any further demands can be promptly and satisfactorily met.

### Sir Max Muspratt's Estimate

As illustrating the many ramifications of the industry in the markets of the world, we cannot do better than quote Sir Max Muspratt, late chairman of the Association of British Chemical Manufacturers, who sums up the position as follows:

"The history of chemical manufacturers in this country is a long and honourable one. Those who visit the British Empire Exhibition are able to realise something of what the British Chemical Industry stands for in the economic system of the country and the Empire. It is well to remind ourselves of the part played by chemicals in the foreign trade of this country. For many reasons, into which at the moment it is not necessary to enter, the Continent of Europe does not play the same part in the English chemical trade as it at one time did. Tariff walls have been built up by all the principal countries of the Continent, but in South-Eastern Europe, in the countries of the Levant, and in Northern Europe, the British manufacturer still has many interesting points of contact. Mexico, Central America and South America still trade with him, and the very names by which the pioneers introduced themselves to buyers in these parts are still household words. The Colonies and Dominions, South Africa, Australia, Canada and New Zealand are still buyers of British chemicals, while in India, China, Japan, the Dutch East Indies and the Straits Settlements, not only has the position of the British manufacturer been maintained, but it shows progress to an extent that would astound the forerunners in the industry. Chemicals have thus brought the United Kingdom into business relations with almost all peoples, and have added to those foremost of civilising factors, better mutual knowledge and appreciation between the peoples of the world."

### Increased Manufacturing Output

The British chemical industry, by dint of exercising all those qualities which are necessary for progress, has now arrived at a point when it can supply all chemicals, both industrial and pharmaceutical. Moreover, it has been demonstrated that such British products as have not previously been known on foreign markets have met with a ready acceptance when offered, in view of the fact that the quality of all British chemical productions has been main-

tained at a very high level. This is a point upon which too much insistence cannot be laid. British goods as a whole have an excellent reputation for quality, and chemicals form no exception to the rule. Their quality leaves nothing to be desired. Independent and unprejudiced reports which have been received testify that British analytical re-agents and research chemicals, though subjected to tests far more searching and rigid in character than those accorded in pre-war times to the products of Merck, Shuckhardt and Kahlbaum, whose names were everywhere accepted as a guarantee of quality, have come through with flying colours and are now acknowledged to be products of the very highest standard. So far as heavy chemicals are concerned, including alkalis and acids, this reputation was established in the last century and has been maintained solely by the quality of the products.

### The Lessons of Wembley

The present strong position of the British chemical industry may be well gauged from the exhibit which it has staged at the British Empire Exhibition. The display has attracted an enormous amount of interest and is certainly very representative, showing clearly the great part which the industry plays in the economic system of the country. The excellence of the exhibit has really resulted from the fact that there is union in the industry, which has unreservedly supported the Association of British Chemical Manufacturers in its endeavour to arrange a first-class display. The exhibit exemplifies the practical value of closer co-operation between individual manufacturers, but it also instances the possibilities of closer co-operation between the industry and pure science. The decorative scheme employed is striking, and it is not surprising to learn that the whole exhibit cost the Association more than £100,000. But it cannot be doubted that the money has been well spent, for a study of the exhibit cannot fail to show how intimately almost every other industry is linked up with the chemical industry, the prosperity and development of which are thus vitally important.

### Fertilisers and Heavy Chemicals

A branch of the industry which is of primary importance to many countries is the manufacture of artificial fertilisers. The use of these has become very general during recent years, and it has been demonstrated that larger and better crops can be grown as a result of their use. The British industry is able to supply these in all forms and in any quantities. Among the heavy chemicals manufactured may be mentioned copper sulphate, which is hardly used at all within the country but practically all exported to countries abroad for the treatment of grape vines. Fertilisers of many other classes are also manufactured and exported, although the country lacks most of the natural resources necessary for the production of artificial manures. In spite of this drawback,

however, the country has successfully built up a trade in the export of chemical fertilisers, the chief products being sulphate of ammonia, superphosphate of lime and basic slag, though certain quantities of such articles as fish meal, meat meal, ground dried blood, shoddy, etc., are produced as by-products of the industries concerned. Large quantities are exported to the various parts of the Empire and to foreign countries, Spain and France having been large buyers during recent years so far as Europe is concerned. It is considered that, as economic conditions on the Continent improve, the quantities of artificial fertilisers purchased from British sources will materially increase.

Turning again in rather more detail to the heavy chemical industry, it is safe to say that Great Britain reigns supreme so far as the manufacture of alkali is concerned, the most up-to-date processes of every kind being employed. Where protective tariffs do not render competition artificial, the British product is invariably selected, and even in highly protected countries, such as the United States and parts of Europe, it is looked upon as a reservoir in times of shortage. The alkali industry has steadily advanced during the last hundred years. Many large consuming countries have developed alkali works behind specially erected tariff walls, but the world's consumption has so constantly increased that, apart from local disturbances due to changes of process, the total outlet is constantly increasing, and is even now greater than it has ever been before. So far as the products of the distillation of coal are concerned, the enormous sources of raw material in Great Britain have placed the country in the forefront in this respect. The war contributed to the development in this branch, for the problem of the conversion of ammonia into nitric acid was tackled and successfully solved.

#### Synthetic Ammonia

A large factory has since been completed for the production of synthetic ammonia from atmospheric nitrogen and purchased by the well-known firm of Brunner, Mond and Co., who have shown great enterprise in tackling this difficult problem. Although output has not yet reached a commercial scale, there seems adequate promise of the successful establishment of a process for the fixation of atmospheric nitrogen. Since the war, also, great strides have been made in the perfection of the process for the production of nitric acid from ammonia. The economic utilisation of synthetic ammonia or ammonia as a by-product from gas works is of prime importance, and it is satisfactory to record large scale production of nitric acid from this raw material. With this strong position in alkali, acid, nitrogen compounds and coal tar primary products, Great Britain is fully equipped with the raw materials for a successful dye and fine chemical industry, and in both these fields much progress has been and is being made. So far as the dyestuffs industry is concerned, there can be no doubt that foreign consumers of good quality dyes can count upon the British industry for many of their needs.

It is thus clear that the British chemical industry is in a position to render material help to all those industries which need its services. These industries are many, and there is scarcely a country in the world which does not possess one or more of them. The home demand can be well supplied, and there still remains a large quantity available for export.

#### Trade Control in Occupied Germany

UNDER the decisions regarding the application of the Dawes Report reached at the London Conference, it is contemplated that the trade control in the occupied territory of Germany will be transferred from the Franco-Belgian authorities in that territory to the German authorities by the following stages:—

September 9.—Abolition of the Customs barrier between unoccupied Germany and the occupied territory of Germany.

September 22 (or earlier, if possible).—Franco-Belgian authorities in the occupied territory of Germany to apply the German tariff instead of the Inter-Allied tariff.

October 22 (or earlier, if possible).—Franco-Belgian authorities in the occupied territories to transfer the Customs administration and the control of imports and exports to the German authorities.

## Licences Under Patents for Food

### Decision in the Boehm Case

IN the 1919 Patent Act there is a section a portion of which reads as follows: "In the case of any patent for an invention intended for or capable of being used for the preparation or production of food or medicine, the Comptroller shall, unless he sees good reason to the contrary, grant to any person applying for the same a licence limited to the use of the invention for the purposes of the preparation or production of food or medicine but not otherwise; and, in settling the terms of such licence and fixing the amount of royalty or other consideration payable, the Comptroller shall have regard to the desirability of making the food or medicine available to the public at the lowest possible price consistent with giving to the inventor due reward for the research leading to the invention."

Under this section Messrs. Fredk. Boehm, Ltd., London, importers of chemical substances, applied to the Comptroller for a licence to use the inventions protected by three patents granted to E. V. Schou for processes for the production of oleaginous materials capable of use in the manufacture of margarine and for certain claims for the products obtained by the said processes. The official report states that Messrs. Frederick Boehm, Ltd., had imported in small quantities and desired to import on a commercial scale a substance known as "Yolko" intended for use in the manufacture of margarine, and that, for the purpose of the application, it was admitted that "Yolko" was an infringement of the second patent, the substance covered by which was intended for use in the manufacture covered by the first patent.

It was contended at the hearing on behalf of Messrs. Fredk. Boehm, Ltd., that the fact that they were importers only as distinct from actual manufacturers was no bar to the grant of a licence.

On behalf of Mr. Schou, it was contended that mere importation and sale by Messrs. Fredk. Boehm, Ltd., would not constitute a "use" of the invention as contemplated by the section in question.

The Comptroller decided to grant a licence. An appeal was taken to the Court, where considerable argument took place as to the meaning of the word "use" in the section, and the appeal was allowed.

In the course of his judgment Mr. Justice Astbury said: The only question really that I have to decide is what is the meaning of the words "grant to any person applying for the same a licence limited to the use of the invention for the preparation or production of food." Does it mean that the licence should be granted only to a person who wishes to use the invention for the purpose of preparing or producing food; or can it receive the wider construction and apply generally to any person who in no sense intends to prepare or produce food but who wishes generally to have a licence to infringe? I think that the former is the true construction. I think that a person coming for a licence under this section must fall within a class intended to be benefited by the section, and I think the "licence to use the invention for the purpose of the preparation or production of food" means that it is to be granted and only granted to a person who wishes by preparing or producing food to increase the food stock of the country. The applicants here desire and only desire to have a licence to import and sell "Yolko" in this country.

The above decision is the first of its kind under the section in question. H. T. P. GEE.

### Sir Alfred Mond's Return

SIR ALFRED MOND'S return to Parliament as the Member for Carmarthen will be welcomed by many more than the members of his own party. Apart from his admitted success as a Minister, he has latterly emerged as one of the ablest debaters in the House, and perhaps the highest authority on economical and commercial questions. In connection with the European settlement and with the various proposals promised by the Government it is a national asset to have in Parliament a financial authority of Sir Alfred Mond's standing. He is also a valuable addition to the group of members directly interested in chemical industry and able as occasion arises to advise the Government on matters involving technical considerations.

## Natural and Artificial Silk

By David Bronnert

*The notes published below are taken from a contribution by Mr. David Bronnert, a relative of Professor Emile Bronnert, the well-known authority on the chemistry of artificial silk, and give in a simple form an account of the natural and artificial silk industries.*

REAL or natural silk is derived from the silk-worm, really the caterpillar stage of a kind of moth, whose favourite and best food consists of the leaves of the white mulberry. In the body of the silk-worm, the substance that becomes the silk fibre exists in the form of two jelly-like masses, which harden on exposure to the air. When the worm is about to pass into the condition which corresponds to the chrysalis of a butterfly, it sends out the substance by two minute openings in its head, and the two streams, at once uniting, form an extremely fine thread, which the worm coils round it so as to form what is called a cocoon. From the cocoon the silk is directly obtained, but the thread of a single cocoon is much too fine for spinning and weaving, and so in reeling off the fibre the threads from the several cocoons are united. It is a very simple matter to bring the single threads together as they are very gummy. For the finest quality of silk, the product of five to seven cocoons is used, and for coarser qualities of silk the product of eleven or twelve or even twenty or more.

After being reeled off from the cocoons, the silk is made up into hanks, and in this form the raw silk is used in commerce. The outer husks of the cocoon and a part of the silk inside cannot be reeled off, and these, together with any other bits of thread, are exported from silk-producing countries, under the names of *husks, knubs and waste*. These are used in the manufacture of silk fabrics, especially in the United Kingdom. Cocoons are also exported from the Eastern countries, but generally only in small quantities, because it takes a hundred pounds of cocoons to produce nine pounds of raw silk, and it is much more economical to carry the silk from one country to another in the form of raw silk rather than in that of cocoons.

For about five thousand years, the silk-worm, which is nothing more than a feeble moth about half an inch in size, has been kept working to make clothes for mankind. It has been robbed of its natural strength, so that it can scarcely fly, and would certainly perish if it returned to its native forests in the Himalayas. It is fed by hand in airy and sheltered rooms, it is protected from disease, and in fact it is true to say that no race-horse has been so carefully bred as the silk moth.

It is thought that the wooded heights of the Himalayas were the first home of the silk-worm, and the Chinese captured the silk-worms on some mulberry bushes and removed them for ever from their native woods. This was 2640 B.C. It is marvellous what progress the patient and industrious Chinese made in domesticating the silk-worm. The silk-worm became a great source of wealth to the Chinese nation, and there was a general conspiracy to keep the origin of silk a secret from foreigners. But about sixteen hundred years ago the Japanese and Indians managed to discover the secret. Two and a half centuries later, the silk-worm was introduced into Europe in yet another manner. Two Persian monks travelling from China to Constantinople with some eggs hidden in a hollow cane presented these to the Emperor Justinian. From the precious contents of this bamboo cane, brought to Europe about the year 550 A.D., were produced all the generations of silk-worms which stocked the Western world, and which gave prosperity and untold wealth to great regions for thirteen hundred years. The eggs of a silk-moth are something like turnip seeds. From one ounce of eggs and one ton of mulberry leaves are produced 140 lb. of cocoons, yielding about twelve pounds of raw silk.

### The Artificial Product

It is only in recent years that it has been found possible to manufacture an entirely new fabric which has all the appearance of natural silk, and which is even stronger and better than the heavily loaded silk on the market. This has become known as artificial silk. The idea was to imitate the natural process carried out by the silk-worm. The name given to the substance which forms the essential solid frame-work of all plants is "cellulose." It is the cellulose which the silk-worm eats and produces a kind of silk gelatin, which goes by the name of sericin in its glands. This sericin is thrust out

by the silk-worm through two minute openings in its head. Man set to work in a more direct fashion with the chemical and mechanical means in his hands. Instead of starting with the expensive mulberry leaf, he chose pine-wood. Next he had to find some means of "digesting" this wood artificially. This he accomplished by boiling it by chemical agencies. Then calling in the aid of powerful chemical solvents, he produced a sticky or viscous mass, just as does the silk-worm. The next process corresponds to the silk-worm thrusting out the viscous mass through two minute openings as already mentioned. The chemist goes one better than the silk-worm, for instead of producing one thread at a time, he uses a perforated platinum nozzle with an infinite number of small holes varying in size and number according to the nature of the silk which it is intended to produce. It now remains only for the fine thread to be rolled up on a bobbin. This is a very quick process, about a yard being turned out per second. It has been estimated that a cubic metre of wood worth 3s. can be transformed into artificial silk worth £7 10s.

The three processes employed in the manufacture of artificial silk differ very little the one from the other. In fact the only real difference is in the kind of dissolvent employed, and the nature of the solution employed to make the cellulose soluble before the dissolving process. It was the Count de Chardonnet who first treated the cellulose with nitric acid and then dissolved the resultant nitro-cellulose in alcohol and ether. This was about the year 1890. In 1891, Messrs. Cross, Bevan and Beadle introduced their process of artificial silk manufacture, and to Messrs. Cross and Bevan we are greatly indebted for the progress made in the succeeding years.

The great danger of the Chardonnet process was the explosive properties of the filament produced. Dr. Emile Bronnert discovered a new process, which removed the dangers of an explosion. This consisted in dissolving the nitro-cellulose by a combined treatment with soda and carbon bisulphide, then dissolving in caustic soda. A second process by which artificial silk may be manufactured was discovered by Dr. Emile Bronnert. This consisted in first making the cellulose soluble with acetic or formic acid, then dissolving with a suitable chemical ingredient, and spinning the viscous mass thus produced. A final process is that of dissolving cotton waste or wood pulp in the blue liquid which is formed when copper filings are dissolved in ammoniacal solution. The blue viscous mass is best driven together, or coagulated, in a solution of cane sugar and caustic soda in water. This is the cuprammonium process of Bronnert-Urban-Frémery.

### The Commercial Outlook

From a commercial standpoint artificial silk only dates from the last 25 years. Artificial silk is cheap, brilliant and durable, and it is now procurable on a very large scale. It is more lustrous than real silk. The figures for last year showed the world's production of real silk as 59,000,000 lb., whilst that of artificial silk was well over 79,000,000 lb.

The figures for the most important countries were as follows:—

	lb.
United States .....	23,500,000
England .....	15,340,000
Germany .....	12,584,000
Belgium, Italy, France .....	6,292,000
Other countries .....	9,436,600

The town of Lyons (France) in 1922 produced alone 140 millions francs worth of artificial silk goods, out of a total production for the world of 2,250 million francs, and it is an ardent wish on the part of the people of Lyons to see their town the centre of the artificial silk industry in France, as it has been for centuries that of natural silk. It is noteworthy that the same machines may be used for the artificial silk as for the natural silk, and Lyons has the necessary skilled labour with a centuries-old tradition. But, of course, there are artificial silk mills in many other parts of France: many towns of the north are interested, including Lille, Roubaix,

Rouen, Valenciennes, Givet, and others; and as recently as 1924 a new mill is being erected in Strasbourg.

Meanwhile this new industry has been making great strides in America, particularly in the manufacture of artificial silk stockings, so that in 1922 the United States consumed 5,000 tons of this article alone. It is possible that one day artificial silk will entirely displace natural silk, being cheaper, finer and more lasting. This is thanks to the invaluable services of certain industrial scientists. Their secrets are kept as jealously guarded as those of the Chinese silk-worm farmers in the days of old, but if their methods of working remain yet unpublished, the artificial silks which are produced by them are proof of their unfailing resources and perseverance.

## Canadian Electro-Chemical Industry

### Outstanding Development in the Past Ten Years

THE use of electric power in chemical and metallurgical operations is one of the outstanding developments of Canadian industry, and the publication of a concise and comprehensive review of the present position by the Canadian *Engineering Journal* for July, in the form of an article by Mr. L. E. Westman, is to be welcomed. This development has been particularly marked during the past ten years, in some cases as an outlet for off-peak loads at existing power plants, and in others the industry has put up its own power plant. The principal centres for the electro-chemical industries in Canada are at Niagara Falls, Ontario; Ottawa, Ontario; Hull, Quebec and Shawinigan Falls, Quebec. In the article referred to detailed consideration of the number of plants in operation is considered under the heads:—(1) Metallurgical, (2) chemical, (3) heat applications.

### Electro-Metallurgical Products

Electric furnaces in Canada are used in the preparation of non-ferrous alloys and metals, such as bronze, aluminium, brass, etc., and there is one large plant for the fusion of copper-nickel matte. There are 36 electric steel furnaces, with an approximate total capacity of 20,000 tons per month, the individual capacities ranging from one to seven tons per heat. There are also 10 pig-iron furnaces, with a total rated output of 3,000 tons per month, and also nine large furnaces for ferro-silicon and one for ferro-chrome.

Electrolytic processes are used to obtain a number of metals direct from their ores; these are aluminium, zinc, copper, lead, nickel, magnesium, gold, and silver. Complete figures of the power used are not available, but the Northern Aluminium Co. uses 45,000 h.p. at Shawinigan Falls for the production of metallic aluminium. Although 85 per cent. of the world's nickel supply is obtained in the Sudbury district electric energy is not available there, but there is an electrolytic refinery at Deschênes, Quebec, using 6,000 h.p. and shortly to be enlarged to 10,000 h.p.

### Chemical Products

Calcium carbide is one of the chemical products for which Canada is most noted, and this is obtained at four plants. The Canada Carbide Co. at Shawinigan Falls used 30,000 h.p. and another 14,700 h.p. for synthesising of acetylene, acetic acid, and acetone from the carbide.

The American Cyanamid Co., at Niagara Falls, Ontario, has a works capable of turning out 60,000 tons of calcium cyanamide, by direct fixation of nitrogen in electric furnaces. The cyanamide is mainly exported to the U.S.A. for use as a fertiliser and for the production of organic chemicals.

Phosphorus, carborundum, oxygen, hydrogen, caustic soda, liquid chlorine, and bleaching powder are all produced at various points in Canada. An experimental nitrogen fixation plant using the arc process was in operation for a while in British Columbia, and another plant using a rotating arc is proposed in the Niagara district.

Hydro-electric power is used for the production of heat for various purposes in chemical industries including evaporation and steam raising.

Owing to large numbers of untouched sources of hydro-electric power in Canada the industries depending on this source of energy are considered likely to develop considerably in the future. On the whole, however, chemical industries will probably find their greatest immediate expansion in the further utilisation of off-peak loads at existing plants.

## Chemical Trade Returns for July

### Total Increase in both Imports and Exports.

THE total imports of chemicals, dyes, drugs and colours, during July amounted in value to £1,146,410, which represents an increase of £352,994 over July, 1923, and £37,594 over the figures for the previous month. The exports also show an increase, the figures being £2,207,457 for July, which is £304,803 above June, and £468,121 above July, 1923.

Notable increases in imports occur in the case of calcium carbide, sodium compounds, barytes and white lead, while the outstanding points on the export side are the useful increase in the sulphuric acid figures, and the increased quantities shown by tar oil and creosote, potassium and sodium compounds. A decrease in the exports of synthetic coal tar dyestuffs is to be noted. A slight decrease is also indicated in sulphate of ammonia, but this is more than accounted for by the fall from 8,272 cwt. to 400 cwt. in the quantity sent to Japan.

### Imports for July

INCREASES.		1924	1923
Acid, tartaric .....	cwt.	4,690	2,680
Bleaching materials.....	"	8,617	1,608
Calcium carbide .....	"	88,312	37,159
Nickel oxide .....	"	2,222	1,800
Sodium nitrate .....	"	41,247	40,889
Sodium compounds, except nitrate ..	"	29,114	11,647
Cream of tartar .....	"	5,774	4,588
Zinc oxide .....	tons	845	484
Intermediate coal tar products, including aniline oil, and salt, and phenyl glycine .....	cwt.	112	10
Alizarine dyestuffs .....	"	844	734
Barytes, including blanc fixe .....	"	61,725	39,808
White lead .....	"	14,388	8,453
Painters' colours, unspecified.....	"	87,136	54,611
Essential oils, except turpentine....	lb.	331,080	192,481
Turpentine .....	cwt.	49,245	32,139

### DECREASES.

Acid, acetic.....	tons	600	752
Borax.....	cwt.	4,903	7,450
Glycerin, crude .....	"	706	1,857
Glycerin, distilled .....	"	64	352
Red lead and orange lead.....	"	3,410	5,040
Potassium nitrate .....	"	3,465	15,541
Potassium compounds, except nitrate .....	"	147,275	147,465
Unspecified coal tar dyestuffs .....	"	2,569	4,272
Synthetic indigo.....	"	nil	nil
Natural indigo .....	"	24	30
Mercury.....	lb.	56,540	114,092

### Exports for July

INCREASES.		1924	1923
Acid, sulphuric.....	cwt.	2,886	1,961
Acid, tartaric .....	"	1,157	648
Ammonium chloride .....	tons	299	176
Benzol and toluol.....	galls.	266,626	67,763
Acid, carbolic .....	cwt.	16,137	9,648
Tar oil, creosote, etc.....	gals.	5,255,444	2,029,275
Unspecified coal tar products .....	cwt.	45,112	30,291
Glycerin, distilled .....	"	15,730	3,986
Potassium chromate and bichromate.....	"	2,517	1,530
Potassium nitrate .....	"	1,679	714
Other potassium compounds .....	"	1,447	1,414
Sodium carbonate, etc. ....	"	540,015	414,608
Caustic soda .....	"	162,736	111,391
Sodium chromate and bichromate.....	"	7,688	1,775
Unspecified sodium compounds....	"	77,890	29,168
Dyestuffs, other than coal tar.....	"	6,581	4,300
White lead .....	"	19,401	15,811
Painters' colours, ground .....	"	31,743	25,545
Paints, etc., prepared .....	"	37,254	22,495

### DECREASES.

Ammonium sulphate.....	tons	20,047	20,586
Anthracene .....	cwt.	nil	nil
Naphtha .....	gals.	4,699	9,281
Naphthalene .....	cwt.	1,400	19,856
Copper sulphate .....	tons	1,138	1,290
Glycerin, crude.....	cwt.	211	6,789
Sodium sulphate, including salt cake ..	"	93,238	212,546
Zinc oxide .....	tons	238	243
Coal tar dyestuffs.....	cwt.	9,516	15,023
Barytes, including blanc fixe .....	"	3,160	14,167
Unspecified painters' colours .....	"	49,480	46,671

### "Wanted"

To the Editor of THE CHEMICAL AGE.

SIR,—With reference to your editorial appearing in the current issue under the heading of "Wanted," it may interest your readers to learn that this matter was also gone into very fully by the British Association of Chemists, and as the result of our inquiries additional information was placed at the disposal of the police at Birmingham and Salisbury.

It is perhaps inevitable that bogus agencies arise from time to time, but our investigation has brought to light an even more pernicious procedure, in that the replies to advertised vacancies are being used by moneylenders as a source of possible "clients." The effect of the receipt by a chemist, perhaps in low water through a long period of unemployment, of such circulars is obvious, and steps will be taken by this Association to prevent as far as possible any continuance of the system.—Yours, etc., I. BOODSON, *General Secretary*.

British Association of Chemists,

Bedford House, 108, Baker Street, W.1.

August 16.

### "Fixing a Selling Price"

To the Editor of THE CHEMICAL AGE.

SIR,—I have read with great interest Sir Ernest Benn's article on "Fixing a Selling Price" and think you might be interested in a phrase invented by a confrère of mine in the Detroit Edison Company. He suggests, in all cases when a price is fixed, it is based on an estimated future cost and not on a past cost, except to the extent that the past cost is a basis for the estimate as to the future cost. He then continues that there are two costs, one the seller's cost which is the seller's estimate of what it will cost him to make the article or to replace it if it is already made and in stock. To this he must add something for his time and trouble, so that this becomes seller's cost plus. The other cost is what it would cost the buyer to supply himself otherwise, either by making the article himself or buying it from someone else. The buyer must have a profit just as the seller, since no transaction is satisfactory unless there is a profit on both sides. Hence, we arrive at a term, buyer's cost minus. This, of course, is the antithesis to seller's cost plus.

It is then easy to show, as Sir Ernest Benn does in his article, that seller's cost plus is never an incentive to economy, but, on the other hand, nearly always an incentive to waste, while on the other hand if the principle of buyer's cost minus be adopted there is every incentive to economy. If the cost is fixed as buyer's cost minus, then the seller makes every effort to reduce his expenditure in order to increase his profit, while, on the other hand, the buyer continues to use his brains to reduce his (the buyer's) cost so as to keep the future prices down.—Yours, etc., R. S. HALE.

Boston, Mass., U.S.A.

July 30.

### Oil in Iraq

LIEUT.-COMMANDER KENWORTHY (House of Commons, August 7) asked the Secretary of State for the Colonies whether any exploration for mineral oils had taken place in Iraq since the armistice with Turkey; whether any wells had been drilled; whether any seepages had been found; what had been the result of the explorations; and what were the prospects of finding and winning oil in the territories of Iraq, including the province of Mosul.

The Secretary of State for the Colonies (Mr. Thomas) said he was afraid he could not give all the information desired. Pending an administrative settlement, action was taken by His Majesty's Government to discourage exploration for mineral oil in Iraq, and had, he believed, been effective; but a small amount of oil was won and used exclusively for military purposes. The only operations of any importance of which he was aware were those carried out by the Anglo-Persian Oil Co. in the transferred territories, a narrow strip of country on the Perso-Iraq border which was formerly part of Persia and is covered by the concession granted to Mr. W. K. D'Arcy by the Persian Government. He did not know what prospects there were of finding oil in the territories of Iraq, including Mosul; but the principal oil companies of the world, whose opinion was probably more valuable than his own, seemed to think that the prospects were good.

### Luton Chemical Works Dispute Ended

THE dispute between B. Laporte, Ltd., chemical manufacturers, Kingsway, Luton, and their employees who joined the National Drug and Chemical Union, has ended.

The dispute arose through a certain number of men joining the union, and the firm decided that those who refused to give an undertaking that they would not be members of the union would not be allowed to continue in the firm's employ from Monday morning of last week. Although this ultimatum only affected a small number, by the end of the week the total of those "locked out" had increased to 160 out of 271 process workers.

Mr. A. J. Gillian, general secretary of the union, intervened, and a conference was brought about by the Conciliation Department of the Ministry of Labour between the firm, Mr. Gillian, and two representatives of the workers. On Wednesday the firm withdrew their condition of employment that the men should not be members of the union, and the men subsequently accepted the firm's terms. Our correspondent was informed on Saturday by the managing director (Mr. H. E. Alcock) that all the men had not returned, but from Monday it was expected that conditions would be normal and that the works would be going at full speed.

### The Question of Recognition

The firm are desirous of correcting a wrong impression. It is thought that the firm, in raising the embargo on the union, are fully recognising it in the sense of making the works solely a trade union works. This is not the firm's view of the matter. "We have simply said," stated Mr. Alcock, "that the works are open to union as well as to non-union men. Mr. Gillian himself made it perfectly clear that they came in on the terms of my letter."

On Friday, August 15, the following notice was posted in the works:—"With reference to the recent unfortunate dispute with a section of our men, who, we are glad to see, have returned to work, we wish to reiterate that these works remain open to all men, whether members of a trade union or not. Any question affecting the welfare and working conditions of the men may be raised through the works committee, which represents both sections. The directors sincerely hope that all men will work amicably together."

A sum of £120 dispute benefit was paid out to 150 men by the union on Saturday morning.

The latest information is that the expectation of good results is likely to be realised from the settlement of the dispute. This settlement (a correspondent states) is the result of the sane attitude taken up by both the firm and the men, and the good feeling that now exists is indicated by the fact that normal working conditions were resumed on Monday.

### The Late Miss Katherine A. Burke

By the death of Miss Katherine A. Burke, *Nature* states, University College, London, has lost an excellent teacher who was untiring in her devotion to the academic, social, and athletic life of the college. Graduating at Birkbeck College, Miss Burke began her career at University College, in 1898, as a research assistant of the late Sir William Ramsay, and she took a share in the research emanating from the chemical laboratory at about this time. Later, she was appointed to the chemical staff, and was the first woman teacher directly concerned with the teaching of the undergraduates of the college. Miss Burke's original work included research on thorium, the oxides of chlorine, the Joule-Thomson effect, the chemical dynamics of the alkyl iodides, and the absorption spectra of alcoholic solutions of nitrates. The paper on chemical dynamics, with Professor F. G. Donnan (*Journ. Chem. Soc.*, 1904, 555), showed that the order of reactivity of the alkyl iodides varied with the type of chemical reaction investigated, and hence it was not possible to ascribe their reactivity to a uniform cause, such, for example, as a dissociation of the iodides into ions. A research, published jointly with Professor E. C. C. Baly and Miss Effie G. Marsden, on the absorption spectra of the aqueous alcoholic solution of nitric acid and lithium, ammonium, and silver nitrates in relation to the ionic theory, afforded strong support for the

theory of hydrated ions. It was found that the limiting conductivity and the persistence of the absorption band of these solutions showed a minimum at 3 per cent. of water. During the War, in addition to her work in connection with the Voluntary Aid Detachment, Miss Burke found time to assist in the preparation of synthetic drugs, which were so badly needed at that time.

## Corrosion in Food-containing Tins

### Evolution of Gaseous Hydrogen

ACCORDING to a paper read by Messrs. H. W. Powell and E. W. McHenry, of the Dominion Canners' Research Laboratory of Canada, at the seventh Annual Convention of Canadian Chemists, all foodstuffs produce some action on the tin container. In the case of foodstuffs only slightly acid the action is negligible. In other cases what is probably a reaction between sulphurs in the food and the iron in the tin produces a slimy sulphide. Foodstuffs of a decidedly acid nature result in the tin assuming a galvanised appearance, but corrosion seldom reaches a danger point. When corrosion takes place gaseous hydrogen is frequently produced, causing tins to bulge or to become faulty through minute perforations.

The factors influencing corrosion are: (a) acidity of the contents, (b) quality of the tinplate, (c) presence of gaseous oxygen in the tin. It is almost impossible to lessen acidity without impairing the quality of the fruit or food, but one commercial process for canning apples includes soaking the fruit in a weak salt brine to lessen acidity. Attempts are being made to improve the quality of the tinplate. For some years canners have coated the interiors of containers with a vegetable gum lacquer, producing "enamel" tins, and these are now in general use for such foods as stone fruits and soft fruits. The hydrogen produced by corrosion, or perhaps in the corrosive action itself, reduces anthocyanin pigments, destroying natural colours. Enamelling partially prevents this, but its disadvantage is that the coating is often imperfect, and corrosive action attacks the unprotected spots and causes perforation. No process is at present perfect, and these scientists recommend sustained research until a practical solution is found to the problem of resisting corrosion in all tinned foodstuffs.

### Carbolic Acid Still Explosion

A CARBOLIC acid still at the works of Brotherton and Co., at Leeds, exploded on Friday, August 15. The still contained ten tons of crude carbolic acid, which was being distilled, and the distillation had been almost completed. Early in the afternoon the foreman in the department had just been examining the still, and noticing there was something wrong he hurried away. He had not got many yards when the still exploded with a loud report, and a workman saw the top lift high in the air and crash to the ground. The hot acid, residue, bricks and iron piping were hurled in all directions but fortunately no one was seriously hurt. The foreman was blown under another still, but beyond a severe shock he escaped injury.

The explosion knocked the valve off another still, and the escaping hot liquid from this burst into flames. The fire brigade was summoned, but the flames were subdued before it arrived. The heavy top of the still which exploded was cut completely round as if by an acetylene flame, and it came down only a little distance away from the benzol storehouse. Had it fallen on the storehouse there would have been enormous damage and almost certainly loss of life.

The cause of the explosion is at present unknown.

### Appeal to French Chemists

THE FRENCH MINISTER OF AGRICULTURE is asking industrial chemists to make known any discoveries that may make possible the use of any mineral or vegetable carburants in replacing petrol products from abroad. Chemists are invited to deposit suitable specifications before October 1, 1924. One classification is reserved for the treatment and transportation of vegetable oils. The second deals with the liquefaction of mineral combustibles—lignite, shale or peat. Trials will be held of agricultural and other machinery actuated by the derivatives in question at some future date.

## Liquidation of United Laboratories and Chemical Co.

UNDER the compulsory liquidation of the United Laboratories and Chemical Co., Ltd., 97, Queen Victoria Street, London, E.C., the report of Mr. G. D. Peyps, Official Receiver, has been issued to the creditors and shareholders. The accounts show liabilities £8,430 against assets valued at £197, and a total deficiency of £14,729 with regard to contributories, the issued capital being 7,681 managerial shares of 2s. 6d. each and 5,537 ordinary shares of £1 each.

The Official Receiver, who is also the liquidator, reports that the company was formed as a private company in April, 1921, with a nominal capital of £1,000, subsequently increased to £10,000, and its objects were to acquire and exploit generally patents, or other forms of protection relating to disinfectants.

An agreement was entered into between Tele-Dis Services (Founders) Co., Ltd., and this company in December, 1921, under which the Tele-Dis Co. passed over to this company the right to manufacture and sell certain disinfectants and agreeing to retail the products at special rates to the Tele-Dis Co.

In April, 1922, the company also entered into an agreement with Mr. Moss Jay for the purchase of his rights in and about a preparation known as "Raditive," the consideration being £600 in shares and also a sum equivalent to 5 per cent. on the gross business in "Raditive" done by the company.

The failure and insolvency of the company is attributed by the founder, Mr. Moss Jay, to the heavy cost of advertising and exhibition expenses, and to the fact that by reason of the bad summers of 1922 and 1923, and the consequent diminution in the number of flies the various fly solutions ("Sprazone" and "Aeri-Dis" in particular) did not get the market anticipated. He also ascribes the failure indirectly to the unsuitability of the company's various products for export purposes.

### Prize Awards in Technology

IN connection with the technological examinations for 1924 of the City and Guilds of London Institute the following awards are announced:—

Municipal College, Burnley.—Chemistry as applied to the cotton industry, Harry Kimm, first prize and silver medal.

School of Metalliferous Mining, Cornwall.—Occurrence, raising and dressing of ores, Percy P. Edwards, first prize, final, £3 (Cutlers) and silver medal.

Sir John Cass Technical Institute, London.—Metallurgy of the non-ferrous metals (extraction), W. Turberville Phillips first prize, final, and silver medal.

College of Technology, Manchester.—Oils and fats, G. Holroyd Sharples, first prize, final, and silver medal.

South Wales and Monmouthshire School of Mines.—Coke and by-products manufacture, Ivor John Lane, first prize, final, and silver medal.

### Explosion Hazards of Pulverised Coal

AN investigation of the explosion hazards in industrial plants using pulverised coal as fuel, which has been conducted through the U.S.A. Bureau of Mines, for the past several years, has been completed. Practically all the important plants using such fuel were visited, and the installations closely studied for safety conditions and the means employed for eliminating possible hazards. In some plants the Bureau of Mines engineer was able to point out dangerous conditions, and practical changes for their abatement. The results of this research show that the causes of an explosion hazard are similar to those from coal dust in mines. Means of combating them are to prevent clouds of coal dust from getting into the air, and to eliminate possible sources of ignition. A report giving the result of this investigation will be issued by the Bureau of Mines within the next few months.

### The End of Part II

PART II of the Safeguarding of Industries Act, which deals with "dumping," ceased to operate on Tuesday. Part I, which deals with key industries, and includes synthetic organic chemicals, is still in force and will continue in operation until October 1, 1926.

### Scotland's Dye Requirements

ACCORDING to an official American trade report from Dundee the production of coal-tar crudes in Scotland is carried on to a limited extent at a chemical plant in Aberdeen and at some gas works, but there is no manufacturing of intermediates and dyestuffs in the vicinity of Dundee. The chemical works in Aberdeen produce benzol, toluol, and naphthalene, and although they formerly manufactured phenol and cresol, the higher distillation products are now sold in the crude state to English manufacturers. The firm, together with others in Burghhead, Elgin, Inverness, and Perth, markets solvent naphtha.

Although no dyestuffs are produced, their consumption is quite extensive, as large quantities are required for the colouring of jute goods, such as burlaps, Hessian cloths and carpets, the manufacture of which is carried on in Dundee on a large scale. The 60 manufacturers of jute goods are the most important consumers of dyes, and the largest purchasers of dyestuffs are two finishing mills that are engaged solely in dyeing garments. Their requirements include practically the entire range of colours, basic, acid, direct, mordant, chrome, vat and sulphur dyes. They use chiefly basic, direct, and sulphur dyes, and dyes of the direct series are probably most important, a large finishing mill at Perth consuming about 20,000 pounds annually. Supplies are generally purchased direct from the manufacturer, except in cases where foreign dyes are desired, when the business is transacted through manufacturers' agents. German and Swiss producers are represented in the Glasgow vicinity, but have no agents in Dundee. The bulk of the dyes consumed locally are of British origin, but Swiss dyes, and to a smaller extent German dyes, are also used.

American dyes are practically unknown in the Dundee district, but, quality and price being equal, there appears to be a fair market.

### Decline in Polish Alcohol Output

ACCORDING to a report by the U.S. Trade Commissioner the production of alcohol in Poland during the year 1923 amounted to 881,500 hectolitres, compared with 1,963,000 in Germany, and 1,564,831 in France. The Polish 1922 output, 598,100 hectolitres, showed a decided decrease from 2,742,300 in 1914. Active distilleries in 1914 numbered 2,510, while in 1922 there were 1,131. The decreased production was due chiefly to war damage, especially in Galicia, and, in a lesser degree, in Congress, Poland, and the eastern districts. Other factors tending to limit the output were adverse legislation, the monopoly policy of 1919 to 1921, and national excise taxes, as well as high production costs and business uncertainty.

### Dye Testing by Prolonged Boiling

THE U.S. Bureau of Standards, Department of Commerce, has suggested a method of eliminating the variables which enter into laboratory dyeing. It is proposed to dye the fibre cut into very short lengths in a closed dye bath equipped with a reflux condenser to maintain the volume constant and an agitator in the bath to give perfect mixing. The dye bath is surrounded by an outer jacket containing a boiling liquid by means of which the temperature is kept constant. The dyeings are compared under standard conditions of illumination. It is believed that the method will make possible the duplication of results and lead to improved standard dyeing methods for testing the strength and quality of dyes. Dyeings prepared by the method are well suited for reflection measurements.

### Increased Potash Production

THE United States Industrial Chemical Co. is enlarging its new plant at Baltimore, recently completed at a cost of about \$750,000, and proposes to add to the working force until the maximum production is reached. The works manufacture potash, ammonium sulphate and other chemical products, using as raw material the refuse of the neighbouring plant of the United States Industrial Alcohol Co., an affiliated organisation, which manufacture industrial alcohol under a special process from molasses. The new plant is said to be the only one in existence using this source of raw material.

### Chemical Papers at the British Association

IN addition to the papers summarised in our issue last week the following were also presented:—

Isomerism of the Oximes, by Dr. F. W. Atack.

Malic Acid from Maple Sugar Sand, by Professor J. F. Snell.

The Electro-Refining of Nickel, by Mr. R. L. Peek.

In the joint discussion with the Mathematics and Physics Section, the following were included in addition to those by Professor Desch, Dr. Shearer and Mr. W. T. Astbury.

The Relation between Crystal Structure and Refractive Index, by Professor W. L. Bragg, F.R.S.

A Theoretical Calculation of the Rhombohedral Angle of Calcite, by Professor W. L. Bragg and Professor Chapman, F.R.S.

X-Ray Crystallographic Method as an aid to Chemical Research, by Mr. S. H. Piper.

In conjunction with the Physiology Section the following papers were presented at a joint discussion:—

Modern Tendencies of Vitamin Research, by Professor J. C. Drummond.

The Quantitative Distribution and Nutritional Significance of Fat-Soluble Vitamin, by Professor H. C. Sherman.

The Isolation of a Bios from Autolysed Yeast, by Professor Walter H. Eddy.

The Fractionation of Bios, by Professor W. Lash Miller.

Radiant Energy as the Anti-Rachitic Factor, by Professor W. Steenbock.

A joint discussion was also held with Section C. (Geology) on Liquid and Powdered Fuels, when Dr. G. S. Hume presented a paper on "Liquid Fuels in Canada," Professor G. A. Guess on "Pulverised Coal in Some Metallurgical Plants," and Professor W. A. Bone on "Brown Coals and Lignites."

### A Point in Photographic Research

AN interesting contribution to the problem of the sensitivity of silver bromide emulsions in the current number of the *Photographic Journal* is made by Mr. T. Thorne-Baker, F.R.P.S., who points out that one of the causes of sensitivity or "speed" in an emulsion is now thought to be the adsorption of hydroxide ions by the silver bromide grains, and following the work on this subject by Fajans and Frankenburg, a considerable amount of research has been carried out by the British Photographic Research Association to investigate the theory. It seemed that if an electric current were passed through an emulsion, the liberation of hydroxyl ions at the positive pole should, on this theory, sensitise the emulsion, rendering it faster, while the hydrogen ions at the negative pole should neutralise the adsorbed hydroxide ions and reduce the speed of the emulsion. Various experiments were made, passing a current through an emulsion for varying periods, the cathode and anode being separated by a porous compartment, and the results have been to find no diminution of speed or apparent effect on the characteristic curve at the negative electrode, but consistent fogging—with no increase of speed—at the positive pole. Mr. Thorne-Baker adds that it is by no means easy to draw any definite conclusions from such experiments, but it may suggest some new line of research to those investigating the hydroxide-adsorption theory. It seems curious that while the hydroxyl ions produce fog, the hydrogen ions do not affect the speed.

### Superphosphates from Tasmania

THE Electrolytic Zinc Company of Australasia in Tasmania, which has, in the past, concerned itself with the treatment of zinciferous ores by its own special process, is now turning its attention to the manufacture of superphosphates, and has launched a scheme for an output of 50,000 tons a year. The installation of the necessary plant at the company's works near Hobart is nearing completion, and the first shipment of phosphatic rock, amounting to 4,700 tons, has arrived. A start is to be made with the process of grinding this rock, and superphosphate will be ready shortly. The new industry will be very acceptable to Tasmanian farmers, who, hitherto, have had to import all their superphosphate from Australia.

### Canadian Production of Nickel

ACCORDING to a report just issued by the Dominion Bureau of Statistics at Ottawa, there was, in 1923, a marked revival in the production of nickel from the ores of the Sudbury district. The output included 62,057,835 pounds contained in nickel-copper matte as against 17,355,056 pounds from the same source in 1922. The nickel contents resulting from the treatment of silver-cobalt ores increased in 1923 to 396,007 pounds from 242,067 pounds in 1922.

The three producing companies, the British-America, the International Nickel, and the Mond, mined 1,187,355 tons of ore, of which 252,414 tons was hand-sorted and concentrated; the resulting material amounting to 198,410 tons. Total mine shipments were 1,168,139 tons containing 72,855,433 pounds of nickel and 35,635,726 pounds of copper.

The smelters operated by the same companies treated 1,140,160 tons of ore during the period, or almost four times the quantity treated in 1922; the matte produced showed a corresponding gain and amounted to 58,084 tons. Two refineries (the British-America and International Nickel) received 35,668 tons of matte and treated 31,765 tons. The refinery recovery of metallic nickel was 23,203,741 pounds in addition to 11,377,086 pounds of nickel oxides containing 8,853,466 pounds of nickel.

The nickel produced in Canada in 1923 amounted to 62,453,843 pounds, of a computed value of \$18,332,077.

### Skimming Plants for Oil Refineries

TESTS on a semi-commercial scale in the study of skimming plants at oil refineries have been completed by M. P. Youker, refinery engineer, Department of the Interior, attached to the Bartlesville, Oklahoma, experiment station of the U.S.A. Bureau of Mines. Skimming consists of the removal by distillation of the lighter products, essentially gasoline and kerosene, from the crude oil. Field tests were made at various refineries, in order to determine the efficiencies of different types of distillation apparatus in common use, and this work was supplemented by laboratory tests which determine the effects of pressure changes, presence of steam, and rate of vaporisation on distillation. As a result of these tests, an improved type of apparatus was devised for distilling off the gasoline and kerosene. This apparatus, known as a fractionating column, has, it is believed, a greater efficiency than any column unit now in use. The information obtained will be applied on a commercial scale, and arrangements are being effected for full-size installations in commercial plants.

### Liquid HCN in Australia

INVESTIGATIONS are at present being made in Melbourne by two representatives of the Cyanide Gas Co., of South Africa, preparatory to the establishment of a factory in Australia for the production of anhydrous liquid hydrocyanic acid, which is used in South Africa for general fumigation purposes. It is claimed that the difficulties of transportation have been overcome by the use of glass ampoules, sealed with a mixture of sawdust and lime, which neutralises any of the liquid which may leak through breakages. No definite arrangements have yet been made for the establishment of the industry, but the owners of the patents are of opinion that its use in Australia would enable farmers, including cotton, fruit and tobacco growers, to ensure freedom from many of the pests which now cause trouble and loss. Its efficacy as a fumigator of ships, barracks, and public institutions is also claimed to have been proved by experience in South Africa.

### German Potash Plants Closing

REPORTS from Germany state that, owing to financial unrest, many producers, especially in the potash industry, have been forced to reduce their output. Numerous potash works have closed down owing to the bad financial position of the industry. The Federal Potash Council decided at its last meeting to extend the time during which the firms may declare their intention to close unprofitable shafts till December, 1925. Potash sales during the first three months of this year amounted to 110,845 tons of  $K_2O$ , against 230,722 tons during the same time last year.

### Use of Beryl in Porcelain Manufacture

BERYL is commonly one of the accessory minerals in pegmatites, where it occurs in well developed crystals. Transparent crystals of beryl have long been valued as gems, the green and blue varieties, emerald and aquamarine, being particularly popular. In feldspar and mica mines it has been the practice of workmen to break up any beryl crystals which they encountered in search of transparent fragments which might have gem value, discarding the rest of the material as worthless. Until recently this opaque beryl was considered to possess practically no commercial possibilities, although small amounts have been occasionally shipped to Germany for the manufacture of beryllium salts and metallic beryllium, which is said to alloy with iron, forming beryllium steels possessing very desirable properties. Investigations by the U.S.A. Bureau of Standards have shown that when beryl is substituted for feldspar in the manufacture of porcelain in amounts varying from 25 to 45 per cent. of the total mixtures, the other components being silica and clays, a product is obtained which displays a very high electrical resistance and low thermal expansion. This porcelain is, therefore, considered a very promising material for electrical uses. Owing to the scarcity of beryl there has been no commercial production of this type of porcelain.

Serial 2587, *New Uses of Non-metallic Minerals*, contains information in regard to andalusite, cyanite, sillimanite, beryl, spinel and bentonite. Copies of this serial may be obtained from the Department of the Interior, Bureau of Mines, Washington, D.C.

### Alum from Clay

WHAT is believed to be a much-needed, simple, cheap method for the manufacture of pure alum and aluminium salts from impure clays has been devised by investigators attached to the Pacific Experiment Station of the U.S.A. Bureau of Mines at Berkeley, California. The process, when perfected, should replace present methods in which pure salts cost about twice as much as impure salts. Large scale tests on the preparation of aluminium sulphate have been completed by the Bureau of Mines. In these tests, using a unit charge of one ton, the results confirm the conclusions drawn from 100-pound runs previously made, in that it is practicable by a preliminary treatment with acid to remove the iron to a mere trace and most of the potash. This leaves an iron-free residue which can be worked up into aluminium sulphate. Alunite consists of aluminium and potassium sulphates, with iron and other minerals present as impurities. Removal of the iron has been the most difficult problem. Experiments are being continued with the object of determining the best conditions of temperature, pressure, and other factors for maximum efficiency of the process.

### Bituminous Sand Possibilities

THE commercial possibilities of the bituminous sand resources of Northern Alberta are being investigated by Government and other officials. There are three lines along which this sand might be developed:—(1) The crude material might be used for road surfacing, and experiments have pointed to the success of this sand for paving purposes; (2) The separation of the bitumen, which is of a high grade, and its utilisation for a number of recognised purposes for which this material is well adapted; (3) The crude sand might be retorted for the recovery of crude petroleum. Such a distillation has been made, the crude petroleum was fractionally distilled and the various distillates refined. There are strong indications that the associated hydrocarbons can be successfully recovered in this way. This sand may acquire considerable commercial value when processes have been perfected.

### Refractory Service Survey at Boiler Plants

MR. R. A. SHERMAN, engineer, is making observation in the vicinity of New York City in the course of a survey of refractory service in boiler-furnace plants which is being made by the U.S.A. Bureau of Mines. This survey gives promise of definite results in promoting the interest of power-plant engineers in refractory problems and in the obtaining of co-operation of research organisations in solving these problems.

## From Week to Week

LUXEMBURG COMMERCIAL FAIR is to be held from August 20 to 28.

THE AREA under sugar beet in Great Britain is shown by the latest official figures to have increased by 34.9 per cent. compared with last year.

ALSATIAN POTASH PRODUCTION during 1923 reached 1,580,000 tons, compared with 1,200,000 tons in 1920, 600,000 in 1919, and 350,000 tons before the war.

THE DEATH is announced of Mr. William Arthur Davies, managing director of Davies and Son, Ltd., manufacturing chemists, Derby, on Friday, August 16, in his sixtieth year.

A PROCESS FOR CLEANING PAPER MACHINE WIRES with sulphuric acid to which a half per cent. of formaldehyde has been added has been recommended to the Wire Cloth Manufacturers' Association.

DR. R. F. RUTTAN, an ex-President of the Society of Chemical Industry and director of the department of chemistry, McGill University, has been appointed to succeed Dr. F. D. Adams as dean of the faculty of graduate studies and research.

ON SEPTEMBER 22, the duty on coal-tar dyes in America will be reduced from 60 to 45 per cent. The industry has made great strides during the two years that it has enjoyed this protection, and the production in 1923 was 50 per cent. more than in 1922.

AMERICAN TARIFF REGULATIONS governing the entry of coal-tar products have been amended so that importers may learn the United States value for the purpose of assessing duty on non-competitive dyes. The importers have been requesting this change for a considerable period.

THE INDIAN CHEMICAL SOCIETY has been formed with headquarters at Calcutta. Sir P. C. Ray is the first president; Dr. J. L. Simonsen and Professor G. J. Fowler, vice-presidents; P. C. Nutter, treasurer; Dr. E. R. Watson, editor. The first issue of the *Journal of the Indian Chemical Society* is expected to appear during August.

TWO MEN were severely gassed on Friday, August 15, with petrol fumes while working in an empty storage tank at Liverpool belonging to the British Mexican Petrol Co. The tank had been steamed out, and the men had been working in it for ten minutes when the attention of men near by was directed to the tank. One of the rescuers was also severely affected, but all afterwards recovered.

A PLANT for manufacturing anti-fouling paint and composition used on ships is, says Sir William Maxwell, K.B.E., of London, to be established in Vancouver. Sir William is at present visiting the Dominion on behalf of a British company which supplies a large proportion of the paint used all over the world. A principal ingredient of the paint—iron oxide—is found in large quantities in British Columbia.

LARGE DEPOSITS of sulphur in Beaver County, Utah, are being treated to separate the sulphur from the waste material. Flotation experiments showed that between 85 and 90 per cent. of the sulphur could be removed from the waste material, producing a concentrate assaying from 80 to 90 per cent. sulphur. This concentrate can readily be treated and refined into a high-grade sulphur product for the market.

DR. JOHN BOYD ORR, Director of the Rowett Research Institute at Aberdeen, speaking at the British Medical Association at Bradford, emphasized the need of a correct balance in the diet of the chemical elements necessary to life. When this balance was obtained there was no likelihood of any deficiency of vitamins, and he believed that much of the benefit ascribed to vitamins was due to the fact that the same foods contained inorganic constituents tending to restore the balance to normal.

A RECENT SERIOUS FIRE which occurred in the plant of the Netherlands Petroleum and Asphalte Company, at Flushing, raged for 24 hours, all attempts to extinguish the blaze being useless until the chemicals belonging to a Foamite system protecting a large plant at Rotterdam were pumped into railway tank wagons and transported to the scene. With the aid of hastily improvised pipelines and two pumps worked by marines, the liquids were driven through a hose for about 300 metres on to the burning tanks and the fire was extinguished in a very few minutes.

TESTS TO DISCOVER A SUBSTITUTE for ethyl alcohol in flavouring extracts are being conducted at the University of Wisconsin by Professor H. A. Schuette.

MR. HENRY C. BERGER has left the research staff of the U.S. Bureau of Mines to take the position of research chemist for the Armstrong Cork and Insulation Co., Gloucester City, N.J.

MR. D. B. DOW, formerly of the Petroleum Experiment Station of the Bureau of Mines, has been appointed engineer-in-charge at the new station now being established at the University of Wyoming, Laramie.

THE MCGRAW-HILL PUBLISHING CO., LTD., of 6, Bouverie Street, London, has just issued a comprehensive list of their publications dealing with the subject of civil engineering. Full particulars and a short summary of the contents of each book are included.

CECIL WOOD, a young chemist employed in the laboratory at Crigglestone Colliery, near Wakefield, met with a fatal accident when riding a motor cycle on Monday. He was removed to hospital, where he died a few hours later from injuries to the head.

KINEMATOGRAPH FILMS are to be used to illustrate the third autumn lecture of the Institute of Metals, which is to be delivered on September 8, by Mr. W. M. Corse, B.S., on "Recent Developments in Non-Ferrous Metallurgy in the United States, with Special Reference to Nickel and Aluminium Bronze."

COMPLAINTS are being made by small consumers of phosphorus in the United States that they are unable to obtain supplies from American makers, and they are calling for a removal of the duty of 8 cents. Makers have answered the complaints by stating that the industry was previously put out of business by foreign competition, and is only now beginning to recover.

THE GRASSELLI CHEMICAL CO. has established an industrial fellowship at the Mellon Institute of Industrial Research of the University of Pittsburg, for the purpose of developing methods involving the use of zinc chloride in the wood-preservation industry, and work is being carried on in the direction of increasing the permanence of zinc-chloride treatment of timber by the addition of petroleum oils.

OWING to the slow development of the dye industry in Japan, the Government is considering the adoption of protective measures. Japan requires about 10 million lb. of dyes a year, three-quarters of which she can produce herself. British, American, French, Swiss, and Italian dyes are extremely popular in Japan, but Japanese makers are unable to sell their products owing to the preference for imported goods.

SPEAKING at Walsingham on Wednesday, Mr. Noel Buxton, Minister of Agriculture, said that the Government proposed to encourage the building of factories and the growing of sugar beet by making a definite grant for ten years; the scheme was that 19s. 6d. per hundredweight be guaranteed the manufacturer for the first four years, 13s. for the next three years, and 6s. 6d. for a further three years, on condition that the manufacturer paid the farmer not less than 44s. per ton.

NEGOTIATIONS have been concluded in London between the Iron and Steel Trades Employers' Association and the Iron and Steel Trades Confederation with regard to advances in wages of the lower paid men. These wages will, as from Monday next, be increased by a special bonus beginning at 1s. 2d. per shift of eight hours. This advance affects the lower paid workers in the heavy steel trades, who have been badly hit by the effect of the rapid fall in the price of steel under the sliding scale.

DR. W. M. CUMMING, F.I.C., contributed an article recently in the special scientific series in *The Glasgow Herald* on "The Nature of Poisoning," in which he pointed out the necessity of a more careful investigation of the problem. The principal difficulty was that a somewhat unusual combination of chemical and physiological knowledge was required on the part of the investigator. Attention was also drawn to the resemblance between poisoning of the body and poisoning of catalysts, remarkable in view of the fact that many physiological processes were carried out by enzymes in a manner analogous to catalysis.

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## Patent Literature

### Abstracts of Complete Specifications

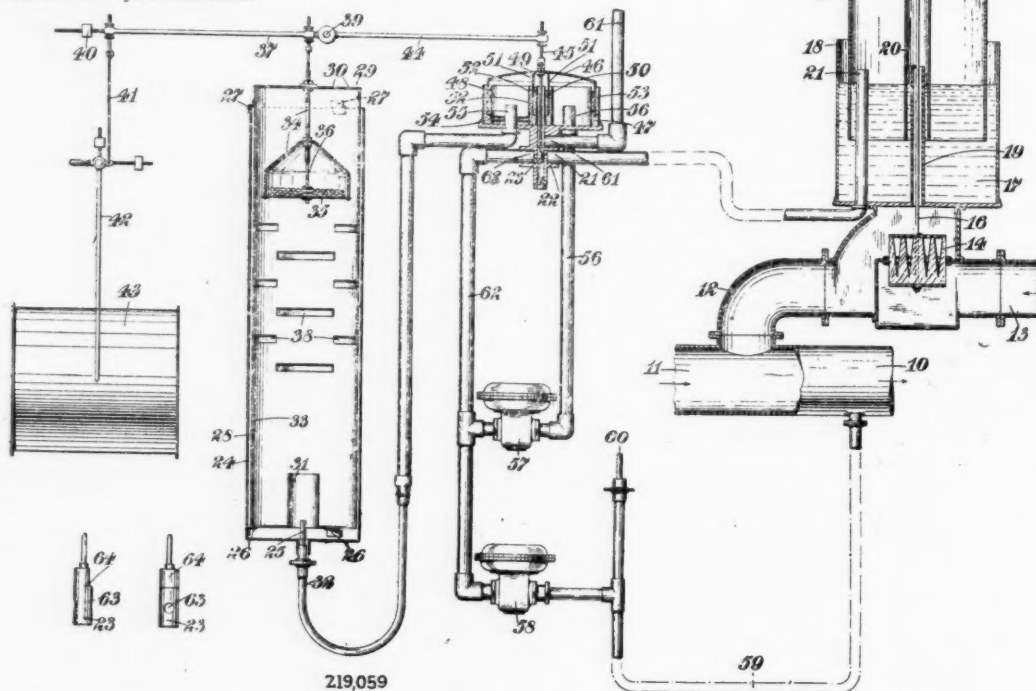
218,854. ACCELERATING THE VULCANISING OF CAOUTCHOUC. British Dyestuffs Corporation, Ltd., V. Lefebure and A. J. Hailwood, 70, Spring Gardens, Manchester. Application date, July 26, 1923.

It is known that the vulcanisation of indiarubber by the Peachey process may be accelerated by adding para-nitroso-dimethylaniline or its homologues and heating, but this substance is liable to be injurious in handling it. It is now found that this disadvantage may be avoided by using a compound of one molecular proportion of para-nitroso-dimethylaniline with two proportions of  $\beta$ -naphthol. This compound is less inflammable than para-nitroso-dimethylaniline, and may be used, transported, and stored as a finely divided powder. The product can be obtained by grinding together the nitroso base and  $\beta$ -naphthol in the proportions mentioned. The compound need not be prepared before use, but the ingredients may be mixed with the rubber. Equivalent nitroso-alkyl-arylamines may also be used, *e.g.*, nitroso-diethyl-aniline and nitroso-monoalkyl-*o*-toluidine.

fuel to be carbonised, as well as the water gas. The oil gas also enriches the distillation gas. Apparatus for carrying out the process is described.

219,059. COMBUSTIBLE GAS, PREPARATION OF. G. E. Holmes, The Residence, Gas Works, Ilford, Essex, and The Gas Light and Coke Co., Horseferry Road, Westminster, London, S.W.1.

The object is to control or maintain constant the heating value of combustible gas or other fuel. A measured supply is delivered to a calorimeter, and the heating value of the gas is caused to vary the composition of the gas as required. A pipe 10 receives a supply of coal gas from a pipe 11 and a supply of water gas from a pipe 12, the latter being controlled by a valve 14. The valve 14 is actuated by a bell 15 floating in liquid 17. The bell carries a central tube 20 enclosing an upstanding tube 19, and the actuating rod 16 passes through



219,059

218,910. OILS AND FATS, PROCESS AND APPARATUS FOR REMOVING ODORIFEROUS SUBSTANCES FROM. H. Bollmann, 1, Alsterdamm, Hamburg, Germany. Application date, November 19, 1923.

Fatty oil or fat is purified and deodorised by passing it downwards through a column packed with Raschig rings through which steam is passed upwards. The column is divided by horizontal partitions having short upstanding tubes covered by hoods, through which the steam passes. The oil collects on the partitions where it is freed from water by heating coils, and then passes through overflow pipes on to the next stage below. The oil then passes to a vacuum apparatus where it is heated to remove the last traces of water, and this process may be assisted by the introduction of superheated steam.

218,925. CARBONISATION OF COAL AND PRODUCTION OF HIGH-GRADE GAS. J. Rude, 19, Ludwigstrasse, Bad-Nauheim, Germany. Application date, December 18, 1923.

Coal is carbonised by means of the gases obtained from water gas producers, and during the blowing period of the latter, an auxiliary gas such as oil gas is introduced. The gases thus obtained from the producer are passed through the

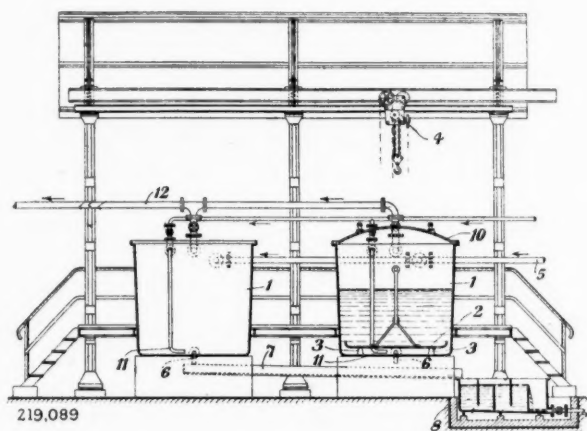
both tubes, so that it is liquid sealed. A calorimeter 24 carries a burner 25, and is provided with an internal casing 28 closed at the top and having perforations 30 for the escape of combustion products. Air for combustion is preheated by passing through the jacket 33, and the combustion products are mixed by means of baffles 38 before reaching an expandable capsule 35. The movements of the rod 34 of the capsule are transmitted through a rod 37 pivoted at 39, and rod 41 to a recording pen 42 moving over a drum 43.

The lever 37 also operates a bell 46 floating in a tank 48 and carrying a valve 23, a liquid seal being provided similar to that for the valve 14. The bell 46 moves in an annular chamber connected by a pipe 54 to the central chamber. The function of the bell 46 is to supply a positive or negative loading to the capsule 35, but it does not operate the valve 23 independently. The mixed gases are supplied from the pipe 10 through a pipe 59 and pressure-equalising devices 58, 57, to the pipe 56, bell 46, and thence to the burner 25. The bell 46 is thus sensitive to changes in density of the gas, or to changes in atmospheric pressure. The function of the valve 23 is to act as a relay, and admit the gas through a pipe 21 to operate the bell 15 controlling the main valve 14. The

proportion of water-gas supplied through the pipe 12 is thus regulated according to the heating value of the gas as measured by the calorimeter.

219,089. **EXTRACTION AND REMOVAL OF RESIN FROM SOLUTION IN ACID.** Coke and Gas Ovens, Ltd., 821-844, Salisbury House, London Wall, London, E.C.2. From firm of C. Still, A. Kuhn, and P. Fritzsche, Recklinghausen, Westphalia, Germany. Application date, April 18, 1923.

The object is to facilitate the extraction and removal of resin from solution in acid which has been used for washing benzol. The plant comprises two or more boiling pots 1, each of which is provided with a removable grid or basket 2 resting on supports 3. The pots are connected by valves to a pipe 5 leading from an agitator in which the benzol is washed, and discharge valves 6 lead to a lead-lined trough 7 which discharges into a separating box 8. The acid to be treated is run into one of the pots 1 till half full, and boiled to precipitate



the resin. The cover 10 is luted with clay, and steam is injected through a pipe 11 to boil the acid. The vapour may be drawn off through a pipe 12 and passed to a saturator containing alkali. The precipitated resin is raised in the grid 2 by means of a crane 4 and allowed to drain.

219,194. **CLARIFICATION AND DECOLORISATION PROCESS FOR THE MANUFACTURE OF WHITE SUGAR.** J. J. Ragg, Lautoka, Fiji. Application date, April 18, 1923.

The object is to obtain a white sugar directly from the cane juices, instead of a raw sugar which must afterwards be treated at a refinery. The cane juice is treated with a saturated aqueous solution of lime and with sufficient powdered lime to make a saturated solution with the water contained in the whole body of the liquid. This removes most of the impurities, and the sugar solution is then heated and mixed with about 1 lb. of carbon per gallon of liquid. Decolorisation then takes place with the use of much less carbon, and more rapidly than in the usual process. The specific gravity of the liquid after the addition of lime should be 1.035-1.040. The liquid after treatment with carbon is filtered through a layer of magnesium carbonate, and is then ready for evaporation to obtain white sugar.

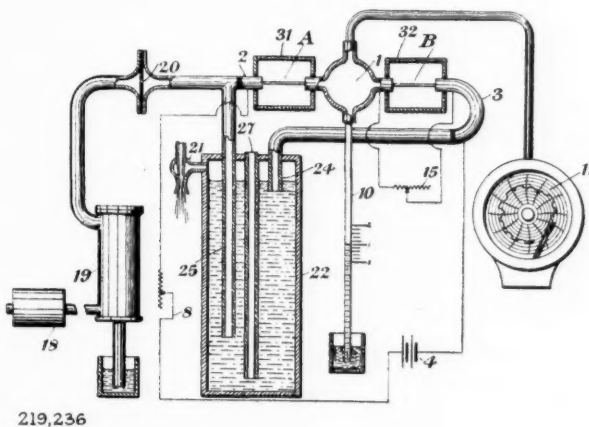
219,236. **DETECTING OR ESTIMATING AND RECORDING COMBUSTIBLE CONSTITUENTS IN GASEOUS MIXTURES.** F. F. Uehling, 86, Park Avenue, Passaic, N.J., U.S.A. Application date, December 12, 1923.

If a gas is passed through a restricted passage to a chamber 1 and then through another restricted passage B, the pressure in the chamber 1 depends on the resistance of the two passages A, B. Any inequality in the resistance of either passage produces a change in the pressure in the chamber 1, provided that the pressures in the pipes 2, 3 are maintained constant. The passages A, B are preferably capillary tubes of platinum, and they are enclosed in jackets 31, 32 to obviate external temperature changes. The resistance offered by these tubes depends upon their temperature, principally due to the change in volume

of the gas on a change in temperature. The tubes A, B are heated by the passage of an electric current from a battery 4, to a temperature which is regulated by the rheostat 8.

Air is forced from the pipe 2 through tube A at a constant pressure and the pressure in the pipe 3 is also kept constant. The pressure in chamber 1 is indicated by a manometer 10 and recording gauge 11. If the entering air contains combustible gas it will be ignited on entering the tube A and will increase the temperature of the tube. The resistance will thus be increased and the pressure in the chamber 1 decreased. The change of pressure thus gives a measure of the proportion of combustible gas entering the tube A. The height of the liquid in the tube 10 can be adjusted to zero by means of a shunt rheostat 15 across the tube B which varies the temperature of the tube B.

The gas to be tested enters through a filter 18, and a drier 19 containing calcium chloride. The gas then passes through an orifice 20 to the tube 2. The flow of gas is caused by a steam or water aspirator 21, and the pressure is kept con-



stant by a regulator 22. This vessel is closed, except for a pipe 27 opening to the atmosphere, and through which air enters the vessel 22 at the submerged end of the pipe. The reduction of pressure in the space above the liquid therefore corresponds to the head of water to the bottom of the tube 27. The pressures in the pipes 2, 3 will be those corresponding to the lower ends of the pipes, 25, 24. The size of the opening 20 must be such that insufficient gas flows through it to satisfy the aspirator 21. The presence and amount of combustible gas is thus indicated by the recording gauge 11.

219,052. **HYDROLYSIS IN GLUE AND GELATIN MANUFACTURE.** T. H. Lloyd, 7, Beacon Hill Road, Newark. Application date, March 17, 1923.

In the manufacture of glue and gelatine, the hydrolysis of collagen or a substance containing collagen is effected in a comparatively short time and at a comparatively low temperature by means of an acid salt of an inorganic acid, preferably acid calcium phosphate. The amount should be 1 per cent. of the weight of bone treated. The acid salt need not be added directly, but may be formed by the action of an inorganic acid on the calcium phosphate contained in the bone.

#### International Specifications not yet Accepted

217,873. **LIQUID FUEL.** D. Annaratone, 36, Corso Oporto, Turin, Italy. International Convention date, June 5, 1923.

A fuel for internal combustion engines comprises a mixture of substances having progressively higher boiling points. Thus a motor spirit is obtained by mixing ether 20 parts, alcohol or benzol 25 parts, heptone 14 parts, toluol 8 parts, fuel oil 4 parts, xylol 3 parts, hydrogenated cresol 2.5 parts, and decahydronaphthalene 2.5 parts. A heavier fuel suitable for Diesel engines consists of petroleum naphtha boiling at 410°-700° F., tetrahydronaphthalene boiling at 400° F., and tar oils boiling at 400°-520° F.

## LATEST NOTIFICATIONS

- 220,282. Manufacture of viscose silk. Akt.-Ges. für Anilin-Fabrikation. August 8, 1923.  
 220,289. Manufacture of artificial threads from viscose. Naamlooze Vennootschap Nederlandsche Kunstzijdefabriek. August 8, 1923.  
 220,302. Manufacture of new intermediate products. Soc. of Chemical Industry in Basle. August 9, 1923.  
 220,303. Manufacture of new dyestuffs. Soc. of Chemical Industry in Basle. August 11, 1923.  
 220,304. Manufacture of condensation products of the anthraquinone series. Farbwerke vorm. Meister, Lucius, and Brüning. August 8, 1923.  
 220,320. Process for treating rubber with aliphatic aldehyde aromatic amine condensation products. Naugatuck Chemical Co. August 8, 1923.  
 220,321. Process for retarding the deterioration of rubber and similar materials and products obtained therefrom. Naugatuck Chemical Co. August 8, 1923.

## Specifications Accepted with Date of Application

- 195,960. Pure sulphuric acid, Processes for the manufacture and production of. Verein für Chemische und Metallurgische Produktion. April 10, 1922.  
 196,924. Rubber, Vulcanisation of. W. F. Russell. April 26, 1922.  
 200,511. Carboxylic acid chlorides, Manufacture of. Farbwerke vorm. Meister, Lucius and Brüning. June 6, 1922.  
 201,942. Recovering chromic salts from residues containing chrome. Jucker and Co., Chemische Fabrik. August 7, 1922.  
 202,625. Distillation or gasification of combustible materials, Method of and apparatus for. A. H. Pehrson. August 19, 1922.  
 206,142. Naphthoquinone derivatives, Manufacture of. Soc. Anon. des Matières Colorantes et Produits Chimiques de Saint Denis, A. Wahl and R. Lantz. October 30, 1922.  
 207,801. Diaphragm for electrolytic processes. P. Reinhardt et Cie. November 28, 1922.  
 211,817. Coking retort ovens. J. Becker. February 23, 1923.  
 218,965. Rubber latex and similar materials, Processes and apparatus for concentrating. General Rubber Co. July 11, 1923.  
 219,471. Combustible gas or gases, Apparatus for the manufacture of. S. Moore and C. Hunter. January 31, 1923.  
 219,719. Metallic tin, Process of producing. E. C. R. Marks. (American Smelting and Refining Co.) February 28, 1923.  
 219,792. Drying processes and apparatus. O. Soderlund, T. Boberg, N. Testrup, and Techno-Chemical Laboratories, Ltd. June 28, 1923.  
 291,805. Water gas apparatus, Means for controlling or operating. Humphreys and Glasgow, Ltd. (W. H. Gartley and O. B. Evans.) July 9, 1923.  
 219,830. Vat Colouring matters, Manufacture and production of. J. Y. Johnson. (Badische Anilin und Soda Fabrik.) September 18, 1923.  
 219,865-6. Combustible gas or gases, Apparatus for the manufacture of. S. Moore and C. Hunter. January 31, 1923.  
 219,846. New azo-dyestuff, Manufacture of. O. Y. Imray. (Soc. of Chemical Industry in Basle.) October 29, 1923.

## Applications for Patents

- Ashcroft, E. A. Electrolytic apparatus. 19,248. August 13.  
 Ashcroft, E. A. Plant for treating ores. 19,249. August 13.  
 Ashcroft, E. A. Treatment of sulphide ores, etc. 19,250. August 13.  
 Boswall, R. O. Viscometers. 19,144. August 12.  
 British Celanese, Ltd. Treatment of acetyl cellulose, etc. 19,292. August 14.  
 Casale, L. Catalytic synthesis of ammonia. 19,063. August 11. (Italy, March 29.)  
 Farbenfabriken vorm. F. Bayer and Co. Manufacture of highly-active silica gels. 19,416. August 15. (Germany, September 3, 1923.)  
 Feld, R. vom. Receptacles for highly volatile, etc., liquids. 19,186. August 13.  
 Goedecke, C. E. J. Production of colour lakes. 19,496. August 16.  
 Goldthorpe, W. O. Treatment of acetyl cellulose, etc. 19,292. August 14.  
 Jones, J. I. M. Dyes and dyeing. 19,066. August 11.  
 Jones, N. C. Producer-gas generators. 19,283. August 14.  
 Kempter, F. Process of making viscose. 19,443. August 16. (Germany, May 15.)  
 Kohlenscheidungs Ges. Distillation of bituminous substances. 19,145. August 12. (Germany, November 28, 1923.)  
 Marks, E. C. R. (Carbide and Carbon Chemicals Corporation). Processes of making concentrated chlorhydrin solutions. 19,244. August 13.  
 Morton, J. (Morton Sundour Fabrics, Ltd.). Dyes and dyeing. 19,066. August 11.

- Scott, W. Apparatus for dehydrating gypsum, etc. 19,208. August 13.  
 Synthetic Ammonia and Nitrates, Ltd. Catalyst. 19,445. August 16. (United States, August 16, 1923.)  
 Synthetic Ammonia and Nitrates, Ltd. High-pressure joints. 19,446. August 16. (United States, August 16, 1923.)  
 Synthetic Ammonia and Nitrates, Ltd. Gas purification. 19,447. August 16. (United States, August 16, 1923.)  
 Winsor, C. B. Retorts for distillation of oils, etc. 19,214. August 13.  
 Zdanowich, J. O. Manufacture of cellulose derivatives. 19,405. August 15.

## Canadian Soapstone Deposits

THE High Commissioner for Canada has received from the Dominion Department of Mines the following statement, prepared by Mr. Hugh S. Spence, of the Mines Branch, who in 1921 examined a newly-discovered deposit of so-called soapstone near Dryden, Ontario, in the Lake of the Woods region.

Soapstone, as the name is commonly applied, includes a wide variety of soft, altered, magnesian rocks, differing considerably in composition, but alike in possessing either a granular or schistose structure, containing an appreciable amount of talc, and being soft enough to be cut into slabs or blocks with an ordinary saw. Many so-called soapstones are altered volcanic rocks, in which the original magnesian minerals have been changed to a soft talcose substance, but the term is not infrequently applied to any soft rock of the talc or serpentine class, irrespective of its origin. In addition to being soft and easily worked, soapstone is a refractory stone, displays considerable inertness to acids and alkalis, and is a poor conductor of electricity and heat.

The Wabigoon soapstone appears to be of high grade, comparing very favourably with the stone at present imported into Canada. The present discovery is of decided economic interest to the Dominion from the fact that the soapstone used by Canadian sulphate (kraft) pulp mills, of which there are over a dozen, is all imported from the United States. The stone is used in the form of blocks or bricks, sawn to size, to line the smelting furnaces in which the "black ash," or used sodium sulphate, is burned. The life of these soapstone linings is relatively short—from six to nine months—so that the cost of lining is a somewhat important item. The development of a domestic source of supply should cut the present laid-down cost of soapstone blocks almost in half. Soapstone is used also for many other purposes, owing to its high capacity for absorbing and retaining heat.

## Float-and-Sink Coal Test

THE float-and-sink test can be applied satisfactorily in determining the possibilities of removal of high-ash impurities from coal by washing, in determining the efficiency of crushing as a means of liberating these impurities from coal, and as a check on the efficiency of washing operations. This has been the experience of the Department of the Interior engineers at the North-west experiment station of the Bureau of Mines at Seattle, Washington, co-operating with the University of Washington in the study of coal-washing problems of that State. In these tests the float-and-sink method was first applied to coarse sizes of coal, but was later tried on the fine sizes. Details of the float-and-sink test for fine coal are given in Serial 2,586, by B. M. Bird, assistant mining engineer, and H. E. Messmore, research fellow. Copies of this paper may be obtained from the Department of the Interior, Bureau of Mines, Washington, D.C.

## Liquid Oxygen Explosives

IN field tests of liquid oxygen explosives, recently made in Colorado by the United States Department of the Interior, through the Bureau of Mines, in co-operation with the Compressed Gas Corporation, various types of cartridges have been tried out in drift rounds at a certain mine. Sensitised lampblack cartridges broke well in the hardest ground, Keiselguhr-oil mixtures of lower rate of detonation broke well in the ore, but not in the harder limestone. Coal dust mixtures broke well in ore. A cheap grade of carbon black gave a perfect break. At the Pittsburg experiment station of the Bureau of Mines physical tests have been made of samples of lampblack and mixtures, to determine their suitability for use in liquid oxygen explosives. Special mercurous azide detonators and electric detonators are being tested to determine their efficiency for use with liquid oxygen.

## London Chemical Market

*The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing those firms' independent and impartial opinions.*

London, August 23, 1924.

THERE is very little of interest to report in the chemical market and business on the whole continues quiet, while the few price changes show movements in the downward direction. It is not expected that there will be any real improvement in the demand during this month. Export trade has been more satisfactory, but a considerably greater volume of business could be accommodated.

### General Chemicals

ACETONE continues in moderately good demand with price firm at £100 per ton.

ACID ACETATE seems somewhat steadier and the price is unchanged. Technical is £43 per ton carriage paid and Pure £43 per ton ex wharf.

ACID CITRIC.—The demand is poor at 1s. 5½d. per lb. less 5 per cent.

ACID FORMIC has been slightly more active but price is unchanged at £55 per ton for the 85 per cent. material.

ACID LACTIC is unchanged in value and demand rather small at £38 per ton for 50 per cent. by volume and £43 per ton for 50 per cent. by weight.

ALUMINA SULPHATE is being pressed for sale by Continental producers, and price is easy at round about £7 5s. to £7 10s. per ton for the 17/18% material.

ARSENIC is unchanged in value, but the tone seems slightly better. The price is round about £45 to £47 per ton.

BARIUM CHLORIDE continues very active and the material has been sold freely at £14 10s. to £15 per ton.

COPPER SULPHATE.—Some inquiry is in evidence for next season and the present value is round about £23 per ton.

CREAM OF TARTAR is fairly easy at 81s. per cwt., less 2½%, and is in only moderate request.

FORMALDEHYDE is in poor demand and quotations fluctuate between £52 and £54 per ton delivered.

LEAD ACETATE is very firm and price is hard at £47 per ton, with a higher tendency.

LIME ACETATE.—Little business is reported although price is nominal, without change at £19 10s. per ton.

POTASH CAUSTIC seems slightly firmer and a fair volume of business has been done on a basis of £27 10s. per ton c.i.f.

POTASSIUM BICHROMATE is only in moderate demand and is unchanged at 5½d. per lb.

POTASSIUM PERMANGANATE is easier and the material is now quoted at round about 7½d. per lb.

POTASSIUM PRUSSATE has been more active and price is inclined to go higher. It is now very firm at 7½d. to 7¾d. per lb.

SODIUM ACETATE continues dull and is quoted at £23 15s. to £24 per ton.

SODIUM HYPOSULPHITE is unchanged in value and the demand is fair at £9 10s. per ton for Commercial.

SODIUM NITRITE is a shade easier at £25 10s. per ton, with a moderate demand.

SODIUM PRUSSATE.—Fair business is reported and price very steady at 4½d. to 4¾d. per lb.

SODIUM SULPHIDE is unchanged in value and is quoted at £14 per ton for concentrated.

### Coal Tar Products

There is little change in the market for Coal Tar Products to report from last week.

90% BENZOL is unchanged at 1s. 6½d. to 1s. 7d. per gallon on rails, although the threatened drop in petrol prices is liable to have an unsteady effect on the price of this product.

PURE BENZOL remains unchanged at the moment at 1s. 11d. to 1s. 11½d. per gallon on rails.

CREOSOTE OIL is steady at 5½d. to 6d. per gallon on rails in the North and 6½d. to 6¾d. per gallon in the South.

CRESYLIC ACID is quietly steady at 2s. to 2s. 0½d. per gallon on rails for the Pale quality 97/99%, while the Dark quality 95/97% remains at 1s. 9d. per gallon.

SOLVENT NAPHTHA has little inquiry and is worth about 11d. to 1s. per gallon on rails.

HEAVY NAPHTHA is also in poor demand and is quoted at 1s. to 1s. 1d. per gallon on rails.

NAPHTHALENES are slightly better, but the price remains unchanged. 76/78 quality is worth £7 to £7 10s. per ton, 74/76 from £6 to £6 10s., while the low grades are quoted at from £4 10s. to £5 per ton.

PITCH remains dull and prices are unchanged at 57s. 6d. to 60s. f.o.b. London, 55s. to 57s. 6d. f.o.b. East and West Coast.

### Nitrogen Products Market

SINCE last week the sulphate of ammonia market has maintained its firmer tendency. Considerable quantities have been sold for prompt shipment to France and Spain as well as to the Colonies at £13 per ton f.o.b. U.K. port. Forward business has also been considerable at prices in advance of this. There is considerable interest in the market in several countries and there is every prospect that the rise in prices for forward delivery will be maintained if not increased.

HOME TRADE.—The prompt demand for home agricultural use is normal for this period of the year, but some of the consumers in the winter months are anxious about supplies and some bookings have been made.

NITRATE OF SODA.—The nitrate of soda market is unchanged. Prices for prompt delivery range from £11 10s. to £12 per ton, c.i.f. European ports, and nitrate can be purchased for forward delivery at prices slightly in advance of this in accordance with position.

### Sulphate of Ammonia Autumn Prices

THE British Sulphate of Ammonia Federation announces that the price of sulphate of ammonia for home agricultural use for September delivery will be £14 2s. per ton, and for October delivery £14 4s. per ton for neutral quality in fine friable condition free from lumps, basis 21.1 per cent. nitrogen. The prices for November will be announced later. Limited quantities of ordinary quality will be available in some districts, and will be sold at 23s. per ton less than the above prices, basis 20.7 per cent. nitrogen.

In the circular containing this announcement the Federation states:—"In spite of the advance in prices over the low figure of £14 per ton, at which we have sold a large quantity for July/August, sulphate of ammonia is still by far the cheapest form of nitrogen available. Our deliveries to British farmers during the past season showed a satisfactory increase over deliveries in the previous year, and we feel sure we can rely on your co-operation to secure even better results this year. In order to avoid risk of disappointment in the spring it is desirable that a certain portion of home requirements should be bought for early delivery. Neutral sulphate of ammonia if stored in a dry and suitable building will keep indefinitely in good condition and without loss." It is understood that quantities purchased at the price stated will be used for home agricultural purposes only, and the contracts contain a clause prohibiting export.

### Explosives in Coal Mines

MR. E. SHINWELL, M.P., the Secretary for Mines, has made an Order adding the following to the list of permitted explosives to be used in mines:—

Cambrite No. 3, manufactured by Messrs. Nobel's Explosives Co., Ltd., at Ardeer, Ayrshire.

Gathurst Powder, manufactured by Messrs. Roburite and Ammonal, Ltd., at Gathurst, near Wigan, Lancashire.

Hawkite No. 2 manufactured by the Colliery Explosives Co., Ltd., Hawkley Hall, near Wigan, Lancashire.

Oxite No. 1, manufactured by the Colliery Explosives Co., Ltd., Hawkley Hall, near Wigan, Lancashire.

## Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at sellers' works.

### General Heavy Chemicals

All grades of Boric Acid have been reduced by £3 per ton as from June 11. Borax prices remain unchanged. Prices remain generally steady.

Acid Acetic 40% Tech.—£23 10s. per ton.  
Acid Boric, Commercial.—Crystal, £45 per ton. Powder, £47 per ton.  
Acid Hydrochloric.—3s. 9d. to 6s. per carboy d/d., according to purity, strength and locality.  
Acid Nitric 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.  
Acid Sulphuric.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 65s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.  
Ammonia Alkali.—£6 15s. per ton f.o.r. Special terms for contracts.  
Bleaching Powder.—Spot, £11 d/d.; Contract, £10 d/d. 4 ton lots.  
Bisulphite of Lime.—£7 per ton, packages extra.  
Borax, Commercial.—Crystal, £25 per ton. Powder, £26 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)  
Calcium Chloride.—£5 17s. 6d. per ton d/d.  
Methylated Spirit 64 O.P.—Industrial, 3s. 1d. to 3s. 5d. per gall. Mineralised, 4s. 2d. to 4s. 6d. per gall., in each case according to quantity.  
Potash Caustic.—£30 to £33 per ton.  
Potassium Bichromate.—5½d. per lb.  
Potassium Chlorate.—3d. to 4d. per lb.  
Salammoniac.—£32 per ton d/d.  
Salt Cake.—£3 10s. per ton d/d.  
Soda Caustic, Solid.—Spot lots delivered, £16 7s. 6d. to £19 7s. 6d. per ton, according to strength; 20s. less for contracts.  
Soda Crystals.—£5 5s. to £5 10s. per ton ex railway depots or ports.  
Sodium Acetate 97/98%.—£24 per ton.  
Sodium Bicarbonate.—£10 10s. per ton carr. paid.  
Sodium Bichromate.—4½d. per lb.  
Sodium Bisulphite Powder 60/62%.—£18 to £19 per ton according to quantity, f.o.b., 1-cwt. iron drums included.  
Sodium Chlorate.—3d. per lb.  
Sodium Nitrate refined 96%.—£13 5s. to £13 10s. per ton, ex Liverpool. Nominal.  
Sodium Nitrite 100% basis.—£27 per ton d/d.  
Sodium Sulphide conc. 60/65.—About £14 10s. per ton d/d.  
Sodium Sulphide Crystals.—£9 per ton d/d.  
Sodium Sulphite, Pea Crystals.—£15 per ton f.o.r. London, 1-cwt. kegs included.

### Coal Tar Products

Prices in this section show some irregularity, according to district. In the north-eastern counties, for instance, anthracene oil, solvent naphtha, and naphthalenes are cheaper than in Lancashire or London. On the other hand, crude carbolic and creosote are dearer.

Acid Carbolic Crystals.—6½d. per lb. Quiet. Crude 60's, 1s. 9d. to 1s. 11d. per gall., according to district. Still quiet.  
Acid Cresylic 97/99.—2s. 1d. to 2s. 2d. per gall. Demand still good. Market firm. Pale 95%, 1s. 10d. to 1s. 11d. per gall. Quiet. Dark, 1s. 9d. per gall. Quiet.  
Anthracene Paste 40%.—4d. per unit per cwt. Nominal price. No business.  
Anthracene Oil, Strained.—8d. to 9d. per gall. Quiet. Unstrained, 7d. to 9d. per gall.  
Benzol.—Crude 65's.—10½d. to 1s. per gall., ex works in tank wagons. Standard Motor, 1s. 4½d. to 1s. 6d. per gall., ex works in tank wagons. Pure, 1s. 8½d. to 1s. 10d. per gall., ex works in tank wagons.  
Toluol.—90%, 1s. 5½d. per gall. Pure, 1s. 8d. to 2s. per gall.  
Xylol Commercial.—2s. 3d. per gall. Pure, 3s. 3d. per gall.  
Creosote.—Cresylic, 20/24%, 8½d. per gall. Not much business. Middle Oil, Heavy, 5½d. to 6d. per gall. in Lancashire. Standard specification, 6d. to 7d. per gall. in Yorkshire.  
Naphtha.—Crude, 8d. to 9d. per gall. Solvent 90/160, 1s. to 1s. 3d. per gall., according to district. Market flat. Solvent 90/190, 1s. to 1s. 1½d. per gall. Demand maintained.  
Naphthalene Crude.—Drained Creosote Salts, £4 to £6 per ton. Quiet. Whizzed or hot pressed, £9 per ton. Little business.  
Naphthalene.—Crystals and Flaked, £13 to £16 per ton in Yorkshire and London respectively.  
Pitch.—Medium soft, 55s. to 60s. per ton, f.a.s. for next season. Frequent inquiries.  
Pyridine.—90/160, 18s. to 18s. 6d. per gall. Fair demand. Heavy, 12s. to 12s. 6d. Little business.

### Intermediates and Dyes

There has been a fair demand for dyestuffs during the past week. Prices remain constant. A number of intermediate products have been reduced in price.

In the following list of Intermediates delivered prices include packages except where otherwise stated.

Acetic Anhydride 95%.—1s. 7d. per lb.  
Acid H.—4s. per lb. 100% basis d/d.  
Acid Naphthionic.—2s. 4d. per lb. 100% basis d/d.  
Acid Neville and Winther.—5s. 8d. per lb. 100% basis d/d.  
Acid Salicylic, technical.—1s. 1d. per lb. Improved demand.  
Acid Sulphanilic.—9½d. per lb. 100% basis d/d.  
Aluminium Chloride, anhydrous.—1s. per lb. d/d.  
Aniline Oil.—7½d. to 8½d. per lb. naked at works.  
Aniline Salts.—7½d. to 9d. per lb. naked at works.  
Antimony Pentachloride.—1s. per lb. d/d.  
Benzidine Base.—4s. 6d. per lb. 100% basis d/d.  
Benzyl Chloride 95%.—1s. 1d. per lb.  
p-Chlorophenol.—4s. 3d. per lb. d/d.  
p-Chloraniline.—3s. per lb. 100% basis.  
o-Cresol 19/31° C.—4½d. per lb. Demand steady.  
m-Cresol 98/100%.—2s. 1d. to 2s. 3d. per lb. Demand moderate.  
p-Cresol 32/34° C.—2s. 1d. to 2s. 3d. per lb. Demand moderate.  
Dichloraniline.—2s. 3d. to 3s. per lb.  
Dichloraniline S. Acid.—2s. 6d. per lb. 100% basis.  
p-Dichlorobenzol.—£85 per ton.  
Diethylaniline.—4s. 6d. per lb. d/d., packages extra, returnable.  
Dimethylaniline.—2s. 3d. per lb. d/d. Drums extra.  
Dinitrobenzene.—9d. per lb. naked at works.  
Dinitrochlorobenzol.—£84 10s. per ton d/d.  
Dinitrotoluene.—48/50° C. 8d. to 9d. per lb. naked at works. 66/68° C. 1s. 2d. per lb. naked at works.  
Diphenylaniline.—2s. 10d. per lb. d/d.  
Monochlorobenzol.—£63 per ton.  
B-Naphthol.—1s. 1d. per lb. d/d.  
a-Naphthylamine.—1s. 4d. per lb. d/d.  
B-Naphthylamine.—4s. per lb. d/d.  
m-Nitraniline.—4s. 9d. per lb. d/d.  
p-Nitraniline.—2s. 3½d. per lb. d/d.  
Nitrobenzene.—5½d. to 5½d. per lb. naked at works.  
o-Nitrochlorobenzol.—2s. per lb. 100% basis d/d.  
Nitronaphthalene.—10½d. per lb. d/d.  
p-Nitrophenol.—1s. 9d. per lb. 100% basis d/d.  
p-Nitro-o-amido-phenol.—4s. 6d. per lb. 100% basis.  
m-Phenylene Diamine.—4s. per lb. d/d.  
p-Phenylene Diamine.—10s. 3d. per lb. 100% basis d/d.  
R. Salt.—2s. 6d. per lb. 100% basis d/d.  
Sodium Naphthionate.—2s. 3d. per lb. 100% basis d/d.  
o-Toluidine.—8½d. per lb.  
p-Toluidine.—3s. 3d. per lb. naked at works.  
m-Tolylene Diamine.—4s. 3d. per lb. d/d.

### Wood Distillation Products

All prices keep fairly stable, but there is room for improvement in business.

Acetate of Lime.—Brown, £14 10s. per ton d/d. Demand active. Grey, £19 to £20 per ton. Fair demand. Liquor, 9d. per gall. 32° Tw.  
Charcoal.—£7 5s. to £9 per ton, according to grade and locality. Demand below normal.  
Iron Liquor.—1s. 7d. per gall. 32° Tw. 1s. 2d. per gall. 24° Tw.  
Red Liquor.—10d. to 1s. per gall. 14/15° Tw.  
Wood Creosote.—2s. 7d. per gall. Unrefined.  
Wood Naphtha, Miscible.—5s. per gall. 60% O.P. Market dull. Solvent, 5s. 6d. per gall. 40% O.P. Fairly good demand.  
Wood Tar.—£5 per ton.  
Brown Sugar of Lead.—£46 per ton.

### Rubber Chemicals

Antimony Sulphide.—5½d. to 1s. 4d. per lb., according to quality.  
Crimson, 1s. 3d. to 1s. 6d. per lb., according to quality.  
Arsenic Sulphide, Yellow.—1s. 11d. per lb.  
Barytes.—£3 10s. to £6 15s. per ton, according to quality.  
Cadmium Sulphide.—3s. 9d. to 4s. per lb., according to quantity.  
Carbon Bisulphide.—£29 to £31 per ton, according to quantity.  
Carbon Black.—7d. to 7½d. per lb., ex-wharf. Dearer.  
Carbon Tetrachloride.—£56 to £60 per ton, according to quantity, drums extra.  
Chromium Oxide, Green.—1s. 3d. per lb.  
Indiarubber Substitutes, White and Dark.—5d. to 7d. per lb. Demand very brisk. Prices likely to remain steady owing to firmness of rapeseed oils.  
Lamp Black.—49s. 9d. per cwt., barrels free.

Lead Hyposulphite.—7½d. per lb.  
 Lithopone, 30%.—£22 10s. per ton.  
 Mineral Rubber "Rubpron".—£16 5s. per ton f.o.r. London.  
 Sulphur.—£10 to £12 per ton, according to quality.  
 Sulphur Chloride.—3d. per lb., carboys extra.  
 Thiocarbamide.—2s. 6d. per lb.  
 Vermilion, Pale or Deep.—5s. 1d. per lb. Dearer.  
 Zinc Sulphide.—7½d. to 1s. 8d. per lb., according to quality

### Pharmaceutical and Photographic Chemicals

The demand for Pharmaceutical Chemicals is better for export to the British Dominions than for the Home Trade.

Acid, Acetic 80% B.P.—£45 per ton.  
 Acid, Acetyl Salicylic.—3s. 2d. to 3s. 5d. according to quality. Good demand. Price firm.  
 Acid, Benzoic B.P.—3s. to 3s. 6d. per lb.  
 Acid, Boric B.P.—Crystal £51 per ton, Powder £55 per ton. Carriage paid any station in Great Britain.  
 Acid, Camphoric.—10s. to 21s. per lb.  
 Acid, Citric.—1s. 5½d. to 1s. 6d. per lb., less 5% for ton lots. Market very weak.  
 Acid, Gallic.—3s. per lb. for pure crystal.  
 Acid, Pyrogallic, Crystals.—6s. 9d. per lb. for 1 cwt. lots. Market firm. Increasing demand.  
 Acid, Salicylic.—1s. 6d. to 1s. 9d. per lb. Market unsettled and difficult.  
 Acid, Tannic B.P.—3s. per lb. Market quiet.  
 Acid, Tartaric.—1s. 1½d. per lb., less 5%.  
 Amidol.—9s. per lb. d/d.  
 Acetanilide.—2s. 1d. to 2s. 3d. per lb. for quantity. Demand slow.  
 Amidopyrin.—13s. 3d. per lb. Neglected. Stocks low.  
 Ammonium Benzoate.—3s. 3d. to 3s. 6d. per lb. according to quantity.  
 Ammonium Carbonate B.P.—£37 per ton.  
 Atropine Sulphate.—12s. 6d. per oz. for English make.  
 Barbitone.—15s. to 15s. 6d. per lb. Quiet market.  
 Benzophenanthol.—5s. 3d. per lb. Small inquiry.  
 Bismuth Salts.—A steady market. Prices according to quantity.  
 Bismuth Carbonate.—12s. 9d. to 14s. 9d. per lb.  
 Bismuth Citrate.—11s. 4d. to 13s. 4d. per lb.  
 Bismuth Salicylate.—10s. 2d. to 12s. 2d. per lb.  
 Bismuth Subnitrate.—10s. 9d. to 12s. 9d. per lb.  
 Borax B.P.—Crystal £20, Powder £30 per ton. Carriage paid any station in Great Britain.  
 Bromides.—Potassium, 1s. 1d. to 1s. 4d. per lb.; sodium, 1s. 2d. to 1s. 5d. per lb.; ammonium, 1s. 3d. to 1s. 6d. per lb. Unsettled. Spot supplies short, raw materials dearer, market very firm and advancing.  
 Calcium Lactate.—Demand active. Good English make can be had from 1s. 7d. to 2s. 6d. per lb.  
 Chloral Hydrate.—4s. to 4s. 3d. per lb. Very firm and scarce.  
 Chloroform.—2s. per lb. for cwt. lots. Very steady.  
 Creosote Carbonate.—6s. 6d. per lb. Little demand.  
 Formaldehyde.—£54 per ton, ex works. English make in casks. About 8s. per cwt. extra for carboys.  
 Glycerophosphates.—Fair business passing. Calcium, soluble and citrate free, 7s. per lb.; iron, 8s. 9d. per lb.; magnesium, 9s. per lb.; potassium, 50%, 3s. 6d. per lb.; sodium, 50%, 2s. 6d. per lb.  
 Guaiacol Carbonate.—10s. 6d. to 11s. 3d. per lb.  
 Hexamine.—3s. 6d. per lb. for English make. Market quiet and steady.  
 Homatropine Hydrobromide.—30s. per oz.  
 Hydrastine Hydrochloride.—English make offered at 120s. per oz.  
 Hydroquinone.—4s. 3d. per lb. in cwt. lots. Foreign make.  
 Hypophosphites.—Calcium, 3s. 6d. per lb. for 28 lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.  
 Iron Ammonium Citrate B.P.—2s. 1d. to 2s. 5d. per lb., according to quantity.  
 Magnesium Carbonate.—Light Commercial, £36 per ton net.  
 Magnesium Oxide.—Light Commercial, £75 per ton, less 2½%; Heavy Commercial, £25 per ton, less 2½%; Heavy Pure, 1s. 6d. to 2s. per lb., according to quantity. Steady market.  
 Menthol.—A.B.R. recrystallised B.P., 62s. 6d. per lb. Market rising rapidly. Synthetic, 26s. to 35s. per lb., according to quantity. English make. Strong demand.  
 Mercurials.—Market flat. Red oxide, 5s. 3d. to 5s. 4d. per lb.; Corrosive sublimate, 3s. 6d. to 3s. 7d. per lb.; white precipitate, 4s. 7d. to 4s. 8d. per lb.; Calomel, 3s. 11d. to 4s. per lb.  
 Methyl Salicylate.—1s. 10d. to 2s. 1d. per lb. Keen competition.  
 Methyl Sulphonel.—26s. per lb.  
 Metol.—11s. per lb. British make.  
 Morphine and Salts.—Reduced by 1s. to 1s. 3d. per oz.  
 Paraformaldehyde.—2s. 10½d. to 3s. per lb. Not very active.  
 Paraldehyde.—1s. 5d. to 1s. 6d. per lb. in free bottles and cases.  
 Phenacetin.—6s. to 6s. 3d. per lb. Price and demand steady.  
 Phenazone.—7s. 6d. A shade firmer. Forward prices higher.  
 Phenolphthalein.—6s. 6d. per lb. Ample supplies.  
 Potassium Bitartrate 99/100% (Cream of Tartar).—88s. per cwt. less 2½% for ton lots. Firm market. Prices have upward tendency.  
 Potassium Citrate.—1s. 10d. to 2s. 2d. per lb. Dearer.  
 Potassium Iodide.—16s. 8d. to 17s. 5d. per lb., according to quantity. Demand continues heavy.

Potassium Metabisulphite.—7½d. per lb., 1-cwt. kegs included.  
 Potassium Permanganate.—B.P. crystals, 7½d. per lb., carriage paid; commercial, 8d. to 8½d. per lb., carriage paid. Keen competition keeps prices low.  
 Quinine Sulphate.—2s. 3d. per oz., in 100 oz. tins. Very heavy demand.  
 Resorcin.—5s. 2d. per lb.  
 Saccharin.—63s. per lb. in 50-lb. lots.  
 Salol.—3s. 6d. per lb.  
 Silver Proteinate.—9s. 6d. per lb.  
 Sodium Benzoate, B.P.—2s. 9d. per lb. Ample supplies B.P. quality available.  
 Sodium Citrate, B.P.C., 1923.—1s. 11d. to 2s. 2d. per lb., according to quantity.  
 Sodium Hypophosphite, Photographic.—£13 to £15 per ton, according to quantity, d/d. consignee's station in 1-cwt. kegs.  
 Sodium Metabisulphite Crystals.—37s. 6d. to 60s. per cwt., net cash, according to quantity.  
 Sodium Nitroprusside.—16s. per lb. Less for quantity.  
 Sodium Potassium Tartrate (Rochelle Salt).—75s. to 82s. 6d. per cwt., according to quantity. Market steady, good demand.  
 Sodium Salicylate.—Powder, 2s. 3d. to 2s. 5d. per lb. Crystal, 2s. 5d. to 2s. 7d. per lb. Flake, 2s. 9d. per lb. Market more active.  
 Sodium Sulphide, pure recrystallised.—10d. to 1s. 2d. per lb., according to quantity.  
 Sodium Sulphite, anhydrous, £27 10s. to £28 10s. per ton, according to quantity, 1 cwt. kegs included. In large casks £1 per ton less.  
 Thymol.—19s. 6d. per lb. Nominal. Very scarce indeed. Still rising.

### Perfumery Chemicals

Acetophenone.—12s. 6d. per lb.  
 Aubepine.—15s. 3d. per lb. Advanced.  
 Amyl Acetate.—2s. 9d. per lb.  
 Amyl Butyrate.—6s. 9d. per lb.  
 Amyl Salicylate.—3s. per lb.  
 Anethol (M.P. 21/22° C.).—4s. 6d. per lb.  
 Benzyl Acetate from Chlorine-free Benzyl Alcohol.—2s. 10½d. per lb.  
 Benzyl Alcohol free from Chlorine.—2s. 10½d. per lb.  
 Benzaldehyde free from Chlorine.—3s. 6d. per lb.  
 Benzyl Benzoate.—3s. 6d. per lb.  
 Cinnamic Aldehyde Natural.—16s. per lb. Advanced.  
 Coumarin.—19s. 6d. per lb. Cheaper.  
 Citronellol.—17s. per lb. Again advanced.  
 Citral.—9s. to 9s. 6d. per lb. Price reduction due to selling competition.  
 Ethyl Cinnamate.—13s. 6d. per lb. Cheaper.  
 Ethyl Phthalate.—3s. 3d. per lb.  
 Eugenol.—10s. 6d. per lb. Cheaper.  
 Geraniol (Palmarosa).—35s. per lb.  
 Geraniol.—11s. to 18s. 6d. per lb.  
 Heliotropine.—7s. 9d. per lb. Advanced.  
 Iso Eugenol.—15s. 9d. per lb.  
 Linalol ex Bois de Rose.—26s. per lb.  
 Linalyl Acetate.—26s. per lb.  
 Methyl Anthranilate.—9s. 6d. per lb.  
 Methyl Benzoate.—6s. per lb.  
 Musk Ambrette.—45s. per lb. Cheaper.  
 Musk Xylol.—14s. per lb. Again cheaper.  
 Nerolin.—4s. 9d. per lb. Advanced.  
 Phenyl Ethyl Acetate.—15s. per lb. Advanced.  
 Phenyl Ethyl Alcohol.—16s. per lb.  
 Rhodinol.—57s. 6d. per lb.  
 Saffrol.—1s. 10d. per lb.  
 Terpeneol.—2s. 4d. per lb. Cheaper.  
 Vanillin.—26s. per lb.

### Essential Oils

Almond Oil, Foreign S.P.A.—15s. 6d. per lb.  
 Anise Oil.—2s. 6d. per lb. Cheaper.  
 Bergamot Oil.—17s. 6d. per lb. Again firmer.  
 Bourbon Geranium Oil.—36s. 6d. per lb.  
 Camphor Oil.—75s. per cwt.  
 Cananga Oil, Java.—10s. 6d. per lb.  
 Cinnamon Oil, Leaf.—6½d. per oz.  
 Cassia Oil, 80/85%.—8s. 9d. per lb. Cheaper.  
 Citronella Oil.—Java, 85/90%, 5s. 8d. per lb. Cheaper. Ceylon, 3s. 7d. per lb.  
 Clove Oil.—8s. per lb. Firmer.  
 Eucalyptus Oil, 70/75%.—2s. 1d. per lb. Price advanced on fair business.  
 Lavender Oil.—French 38/40% Esters, 30s. per lb. Very firm. Higher prices expected owing to bad crops.  
 Lemon Oil.—3s. per lb.  
 Lemongrass Oil.—3d. per oz.  
 Orange Oil, Sweet.—13s. per lb.  
 Otto of Rose Oil.—Bulgarian, 37s. 6d. per oz. Production below normal. Anatolian, 18s. per oz.  
 Palma Rosa Oil.—18s. per lb. Cheaper.  
 Peppermint Oil.—Wayne County, 21s. per lb. Firm spot and forward. Japanese, 16s. per lb. Market rising rapidly.  
 Petitgrain Oil.—9s. 3d. per lb. Cheaper.  
 Sandal Wood Oil.—Mysore, 26s. 6d. per lb. Australian, 21s. per lb.

## Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, August 21, 1924.

THE heavy chemical market continues quiet and there is no change of any importance to record.

### Industrial Chemicals

- ACID ACETIC.—Glacial, 98/100%, £58 to £68 per ton; 80% pure, £45 to £47 per ton; 80% technical, £43 10s. to £44 10s. per ton. All packed in casks delivered c.i.f. U.K. port, duty free.
- ACID BORACIC.—Crystal or granulated £45 per ton; powdered, £47 per ton carriage paid U.K. stations, minimum ton lots.
- ACID CARBOLIC, ICE CRYSTALS.—Unchanged at about 6½d. per lb., delivered.
- ACID CITRIC, B.P. CRYSTALS.—Quoted 1s. 5½d. per lb. less 5%, ex store, spot delivery. Offered for prompt shipment from the continent at 1s. 5d. per lb., less 5% c.i.f. U.K. port.
- ACID FORMIC, 85%.—Spot lots now on offer at £55 10s., ex store. Offered from the continent at about £53 5s. per ton, ex wharf.
- ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy, ex works.
- ACID NITRIC, 80%.—£23 10s. per ton, ex station, full truck loads.
- ACID OXALIC, 98/100%.—Unchanged at about 4½d. per lb., ex store. Offered from the continent at 3½d. per lb., c.i.f. U.K. port.
- ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. De-arsenicated quality, 20s. per ton more.
- ACID TARTARIC, B.P. CRYSTALS.—Quoted 1s. 1½d. per lb., less 5%, ex store, spot delivery. Offered for forward delivery at about 1s. 1d. per lb., less 5%, ex wharf.
- ALUMINA SULPHATE 17/18%, IRON FREE.—Spot lots quoted £8 per ton, ex store. Offered for prompt shipment from the continent at about £7 5s. per ton, c.i.f. U.K. port.
- ALUM CHROME.—Moderate inquiry for export. Price £19 10s. to £21 10s. per ton, f.o.b. U.K. port, according to quality.
- ALUM, POTASH CHROME.—Unchanged at about £26 10s. per ton, ex store.
- ALUM, LUMP POTASH.—Slightly cheaper quotations from the continent. Now quoted £8 5s. per ton c.i.f. U.K. port. Spot lots unchanged at about £9 10s. per ton, ex store.
- AMMONIA, ANHYDROUS.—Unchanged at about 1s. 6d. per lb., ex station. Containers extra and returnable.
- AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton, packed in 5 cwt. casks delivered U.K. port.
- AMMONIA LIQUID 880°.—In steady demand. Unchanged at 2½d. to 3d. per lb., delivered, according to quantity. Containers extra.
- AMMONIA MURIATE.—Grey galvanisers quality unchanged at £30 per ton ex station. Fine white crystals of English manufacture quoted £37 per ton, f.o.b. U.K. port. Fine white crystals offered from the continent at £24 10s. per ton, c.i.f. U.K. port.
- ARSENIC, WHITE POWDERED.—Rather better inquiry. Spot lots still available at £54 per ton, ex store. Quoted £52 5s. per ton, f.o.b. U.K. port for export.
- BARIUM CARBONATE, 98/100%.—Quoted £11 5s. per ton. c.i.f. U.K. port. 97/99% quality, £10 10s. per ton, c.i.f. U.K. port.
- BARIUM CHLORIDE, 98/100%.—Quoted £12 17s. 6d. per ton, c.i.f. U.K. port for white crystals. Crystal powder quoted £12 per ton, c.i.f. U.K. port.
- BARYTES.—Finest English white quoted £5 5s. per ton, ex works. Continental about £5 per ton, c.i.f. U.K. port.
- BLEACHING POWDER.—Spot lots £11 per ton, ex station. Contracts 20s. per ton less.
- BORAX.—Granulated, £24 10s. per ton; crystals, £25 per ton; powdered, £26 per ton carriage paid U.K. stations, minimum ton lots.
- CALCIUM CHLORIDE.—English material unchanged at £5 12s. 6d. per ton, ex station. Continental at about £4 17s. 6d. per ton, c.i.f. U.K. port.
- COPPERAS, GREEN.—Unchanged at about £3 per ton ex works, packed in casks free.
- COPPER SULPHATE.—Quoted £24 per ton, f.o.b. U.K. port for export. Continental material on offer at £23 5s. per ton, ex quay.
- FORMALDEHYDE, 40%.—Unchanged at £53 10s. per ton, ex store, spot delivery. Offered for prompt shipment from America at about £50 per ton, c.i.f. U.K. port.
- GLAUBER SALTS.—English material quoted £4 per ton ex store or station. Continental on offer at about £3 17s. 6d. per ton, ex store. Offered for early delivery at £3 10s. per ton, c.i.f. U.K. port.
- LEAD, RED.—Imported material slightly dearer. Now quoted £41 10s. per ton, ex store, spot delivery.
- LEAD, WHITE.—Also advanced to about £44 per ton, ex store, spot delivery.
- LEAD ACETATE.—White crystals quoted £46 per ton, c.i.f. U.K. port. Brown about £42 per ton, c.i.f. U.K. port.
- MAGNESITE, CALCINED.—Unchanged at about £7 17s. 6d. per ton, ex station, prompt delivery. Hard burnt quality quoted £4 15s. per ton, ex station. Finer quality of continental manufacture quoted £7 15s. per ton, c.i.f. U.K. port.
- MAGNESIUM CHLORIDE.—Quoted £4 5s. per ton, ex store, spot delivery. On offer from the continent at about £3 15s. per ton, c.i.f. U.K. port. Flake quality, 10s. per ton extra.
- POTASH CAUSTIC 88/92%.—Rather higher quotations from the continent. Now quoted £28 per ton c.i.f. U.K. port. Spot lots on offer at £29 10s. per ton, ex store.
- POTASSIUM BICHROMATE.—Unchanged at 5½d. per lb., delivered.
- POTASSIUM CARBONATE.—96/98%.—On offer from the continent at £22 10s. per ton, c.i.f. U.K. port. Spot lots quoted £25 per ton, ex store.
- POTASSIUM CHLORATE.—Unchanged at 2½d. per lb., ex store.
- POTASSIUM NITRATE (SALTPETRE).—Offered from the continent at £25 15s. per ton, c.i.f. U.K. port. Spot lots available £29 per ton, ex store.
- POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Unchanged at about 8½d. per lb. ex store, spot delivery. Offered from the continent at 7½d. per lb., c.i.f. U.K. port.
- POTASSIUM PRUSSIAN (YELLOW).—Quoted 7½d. to 7½d. per lb., ex store.
- SODA, CAUSTIC.—77/76%, £19 7s. 6d. per ton; 70/72% £17 17s. 6d. per ton; 60/62% broken, £19 2s. 6d. per ton; 98/99% powdered, £22 15s. per ton. All ex station spot delivery. Contracts 20s. per ton less.
- SODIUM ACETATE.—Spot lots unchanged at £23 15s. per ton, ex store. Offered from the continent at about £22 10s. per ton, c.i.f. U.K. port.
- SODIUM BICARBONATE.—Refined recrystallised quality £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.
- SODIUM BICHROMATE.—Unchanged at 4½d. per lb. delivered.
- SODIUM CARBONATE.—Soda crystals, £5 to £5 5s. per ton ex quay or station. Alkali 58%, £8 12s. 3d. per ton, ex quay or station.
- SODIUM HYPOSULPHITE.—English material quoted £10 per ton, ex station. Rather cheaper offers from the continent. Now quoted £8 5s. per ton c.i.f. U.K. ports. Spot lots on offer at about £9 15s. per ton ex store. Pea crystals of English manufacture unchanged at £13 15s. per ton, ex station.
- SODIUM NITRATE.—Ordinary quality unchanged at £13 10s. per ton, ex store. 96/98% refined quality, 7s. 6d. per ton extra.
- SODIUM NITRITE.—100% unchanged at £26 5s. per ton, ex store, spot delivery.
- SODIUM PRUSSIAN (YELLOW).—In little demand. Quoted 4½d. per lb., ex station or f.o.b. U.K. port.
- SODIUM SULPHATE (SALTCAKE).—Price for home consumption, £3 10s. per ton, carriage paid buyers' station. Good inquiry for export, and price about £3 per ton f.o.b. U.K. port.
- SODIUM SULPHIDE.—60/65% solid, of English manufacture, £14 15s. per ton, ex station; broken £1 per ton more; flake, £2 per ton more. 60/62% solid offered from the continent at £12 per ton c.i.f. U.K. port; broken, £1 per ton more. 31/34% crystals of English manufacture, £9 2s. 6d. per ton, ex station. 30/32% crystals offered from the continent at £8 7s. 6d. per ton c.i.f. U.K. port.
- SULPHUR.—Flowers, £9 10s. per ton; roll, £8 10s. per ton; rock, £8 7s. 6d. per ton; ground £8 5s. per ton, ex store, prices nominal.
- ZINC CHLORIDE.—98/100% solid offered from the continent at about £24 5s. per ton c.i.f. U.K. port. 96/98% quoted £23 10s. per ton c.i.f. U.K. port. English material for export about £27 5s. per ton f.o.b. U.K. port.
- ZINC SULPHATE.—Continental material quoted £10 15s. per ton c.i.f. U.K. port. English material on offer at about £13 5s. per ton, ex station.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

### Coal Tar Intermediates and Wood Distillation Products

- ALPHA NAPHTHYLAMINE.—Several export inquiries. Price, 1s. 4d. per lb., f.o.b.
- DIANISIDINE BASE.—Home and export inquiries. Price, 17s. 6d. per lb., 100% basis.
- META PHENYLENEDIAMINE.—Good export inquiry. Price, 3s. 10d. per lb. f.o.b.
- META TOLUYLENEDIAMINE.—Considerable export inquiry. Price, 4s. 2d. per lb. f.o.b.
- NITRONAPHTHALENE.—Export inquiry. Price quoted 10d. per lb. f.o.b.
- PERI ACID.—Some export inquiry. Price 2s. 9d. per lb. 100% basis f.o.b.

PARANITRANILINE.—Some home demand. Price, 2s. 3½d. per lb. delivered.

XYLIDINE, COMMERCIAL.—Export inquiry. Price, 2s. per lb. f.o.b., drums included.

## The Manchester Chemical Market

[FROM OUR OWN CORRESPONDENT.]

Manchester, August 21, 1924.

THE position of the chemical market here is much the same as at last report—buying operations are principally for small lots for early delivery dates. The demand for textile chemicals is still restricted, although a slightly improved tone in some sections of the cotton trade has been reported during the last few days. This may be due to the brighter outlook for supplies of raw material. Quotations for most lines of heavy chemicals have been steadier and little or no alteration has occurred since last week.

### Heavy Chemicals

Hyposulphite of soda is still a quiet section, but values have been maintained at £14 to £14 5s. per ton for photographic crystals and £9 7s. 6d. per ton for commercial. The demand for saltcake continues on a very restricted scale, and prices are easy at £3 to £3 10s. per ton. Glauber salts are still offering at round £3 10s. per ton, but no improvement in sales has taken place. Sodium sulphide meets with a moderate demand at £14 5s. per ton for 60-65 per cent. concentrated solid and £9 10s. for crystals. Caustic soda is selling in fair quantities, and values are well held; 60 per cent. material is quoted at £16 17s. 6d. per ton and 76-77 per cent. at £19 7s. 6d. Prussiate of soda is unchanged at 4d. per lb., but buying interest is still small. Chlorate of soda is steady and in fair demand at 2½d. to 2¾d. per lb. Phosphate of soda keeps quiet, but quotations are rather steadier at £13 10s. to £14 per ton. Alkali is firm at £6 15s. per ton, both home and export business being on a fair scale. Soda crystals are only moderately active, but the price is unchanged at £5 5s. per ton. Bleaching powder is meeting with a quietly steady demand at £10 per ton. Acetate of soda continues round £23 per ton without attracting much attention. Bicarbonate of soda is in moderate request, and values are maintained at round £10 10s. per ton. Bichromate of soda is selling in fair quantities at 4½d. per lb.

Both caustic potash and carbonate of potash are rather stronger and a slightly better feeling is reported; caustic potash is offering at about £28 10s. per ton for 90 per cent. material and carbonate at £23. Yellow prussiate of potash is steadier and in better request at 7½d. per lb. Chlorate of potash is in fair demand at 2¾d. per lb. Permanganate of potash meets with a quietly steady sale, prices varying from 7d. to 8d. per lb. according to quality. Bichromate of potash is unchanged from the recent level of 5½d. per lb., but the demand is not too brisk.

Arsenic appears to have recovered somewhat from its recent weakness, for values are steadier although there has not been much expansion in the demand for this material; white powdered, Cornish makes, is quoted at £48 per ton in Manchester. Sulphate of copper has improved a little; current quotations are from £24 10s. to £25 per ton f.o.b. Commercial Epsom salts are steady and in fair inquiry at £4 10s. to £4 15s. per ton; magnesium sulphate, B.P. quality, is quoted at £6 10s. Acetate of lead is quiet but unchanged at round £45 10s. for white and £44 per ton for brown. Acetate of lime is maintained at £16 to £17 per ton for grey and £11 10s. for brown, but not much business is being put through. Nitrate of lead is steady at £41 to £42 per ton.

### Acids and Tar Products

Business in the acid products has been rather restricted. Tartaric and citric acids have been quiet at 1s. 1d. to 1s. 1½d. and 1s. 5d. to 1s. 5½d. per lb. respectively. Acetic acid is easy at £43 per ton for 80 per cent. technical and £68 for glacial, but buying has been on a small scale. Oxalic acid is still inactive at about 4½d. per lb.

In the absence of much actual business pitch is more or less nominal at £2 15s. to £3 per ton. Creosote oil is in moderate demand at 5½d. to 6d. per gallon. Carbolic acid continues dull, although values are unchanged from last week at 6½d. per lb. for crystal and 1s. 9d. to 2s. per gallon for crude. Naphthalenes are quiet at £16 to £17 per ton for refined and from £5 for crude qualities. Solvent naphtha is in poor demand and prices are easy at round 1s. 3½d. per gallon.

## Company News

POWELL DUFFRYN STEAM COAL.—An interim dividend of 5 per cent. (actual), free of tax, is declared on ordinary shares.

UNITED TURKEY RED.—An interim dividend has been declared on ordinary shares of 2½ per cent. actual, free of tax. No interim dividend was paid at this time last year.

MOUNTAIN COPPER.—A scheme has been approved by which each £2 10s. share of debenture stock is to be reduced to £1 by the issue of one £1 ordinary share, the payment of 5s. cash and the cancellation of 5s.

## New Chemical Trade Marks

### Applications for Registration

This list has been specially compiled for us by Mr. H. T. P. Gee, Patent and Trade Mark Agent, 51 and 52, Chancery Lane, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any enquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to September 6, 1924.

"CRYSTON."

449,504. For a preparation for removing scale from boilers. George Batey and Margaret Ellerington Batey, trading in co-partnership, 94, Ayresome Street, Middlesbrough, Yorkshire, manufacturers. June 20, 1924.

"MOROPHOS."

449,298. For ground mineral phosphate for use as a fertiliser. Hollingshurst and Co., Ltd., 41, Trinity Square, London, E.C.3, chemical merchants. June 17, 1924.

"DIALAMIDON."

449,529. For chemical substances prepared for use in medicine and pharmacy, with the exception of vulnary powders. Society of Chemical Industry in Basle (a share company organized under the laws of the Swiss Republic) 141 to 227, Klybeckstrasse, Basle, Switzerland, manufacturers and merchants. June 21, 1924. (To be Associated, Sect. 24).

"MACPHALITE."

448,880. For a mixture of tar and bitumen for use in manufactures. Henry Ellison, Ltd., 110, Dawsholm Road, Maryhill, Glasgow, tar and ammonia distillers. May 31, 1924.

Opposition to the Registration of the following Trade Marks can be lodged up to September 13, 1924.

"FOJEL."

449,287. For chemical substances used in manufactures, photography or philosophical research, and anti-corrosives. The Southern Whaling and Sealing Company, Limited, 118, Exchange Building, Liverpool, manufacturers. June 16, 1924.

"PARTNER."

449,428. For chemical substances used in manufactures, photography or philosophical research, and anti-corrosives. Lever Brothers, Ltd., Port Sunlight, Cheshire, manufacturers. June 19, 1924. (To be Associated, Sect. 24).

449,429. For chemical substances used for agricultural, horticultural, veterinary and sanitary purposes. Lever Brothers, Ltd., Port Sunlight, Cheshire, manufacturers. June 19, 1924. (To be Associated, Sect. 24).

449,430. For chemical substances prepared for use in medicine and pharmacy. Lever Brothers, Ltd., Port Sunlight, Cheshire, manufacturers. June 19, 1924. (To be Associated, Sect. 24).

448,610. For cyanides, being chemical substances for use in manufactures. American Cyanamid Company (a Corporation organised under the laws of the State of Maine, United States of America), 511, Fifth Avenue, New York City, United States of America; manufacturers. May 23, 1924. (To be Associated, Sect. 24.)



## Recent Wills

Mr. Joshua Woodhead, of Burnlea, Holmfirth, principal of A. Woodhead and Son, chemical manufacturers, Holmfirth.....	£8,700
Mr. Thomas Edward Riddle, of Hexham, Northumberland, analytical chemist and mineral water manufacturer .....	£9,799

## Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that occur.

### County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

JACKSON (CLAUD), LTD., Theobald's House, Gray's Inn Road, W.C., manufacturing chemists. (C.C., 23/8/24.) £17 7s. 4d. May 2.

MASTER PAINTERS PAINT MANUFACTORY, LTD. (C.C., 23/8/24.) £20 8s. 10d. July 7.

MY VALET, LTD., 62, Oxford Street, W., dyers and cleaners. (C.C., 23/8/24.) £10 9s. 6d. July 11.

WATERHOUSE AND GRAY, LTD., 43-51, Stanley Street, Sheffield, wholesale druggists. (C.C., 23/8/24.) £14 14s. 10d. July 8.

### Mortgages and Charges

[NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an \*—followed by the date of the Summary, but such total may have been reduced.]

SHANKLAND (G. A.), LTD., Eynsham, chemical manufacturers. (M., 23/8/24.) Registered August 8, £2,000 debentures, balance of £18,000; charged on properties at Eynsham, etc., also general charge. \*Nil. January 12, 1923.

SOUTH AFRICAN CARBIDE AND BY-PRODUCTS CO., LTD., London, S.W. (M., 23/8/24.) Registered July 31, £29,640, prior lien debenture stock inclusive of £19,640 outstanding under trust deed dated April 7, 1922 (secured by trust deed dated July 10, 1924), present issue £10,000; charged on property comprised in trust deed dated April 7, 1922; also registered August 6, £300, £200 and £50 debenture stock (dated August 14 and November 13, 1923, and January 29, 1924), part of £20,000; charged on properties at Ballengeish, Natal, also general charge. \*£67,115. March 11, 1924.

SPEEDOL MANUFACTURING CO., LTD., Brentford, paint manufacturers. (M., 23/8/24.) Registered August 6, £5,000 second debentures; general charge. \*— May 2, 1923.

### London Gazette, &c.

#### Company Winding Up Voluntarily

GIFFEN CHEMICAL COMPANY, LTD. (C.W.U.V., 23/8/24.) H. J. Macleish, chartered accountant, Glasgow, appointed liquidator. Meeting of creditors in the chambers of J. Wyllie Guild and Ballantine, C.A., at 116, Hope Street, Glasgow, on Monday, August 25, at 12 noon.

#### Bankruptcy Information

MANGOLD, Louis Augustus, and MANGOLD, Charles Bernard, trading as MANGOLD BROS., 17, Harp Lane, London, E.C.3, chemical merchants. (R.O., 23/8/24.) Receiving order, August 18. Debtors' petition. First meeting, August 26th, 11.30 a.m., and public examination, December 5, 11 a.m., Bankruptcy Buildings, Carey Street, London, W.C.2.

PEARSON, Ralph, Rutland Street Works, Middleton, in the county of Lancaster, trading as ALPHA CHEMICAL AND FINISHING CO. (R.O., 23/8/24.) Receiving order, August 16. Debtor's petition.

### New Companies Registered

BRITISH FERTILIZER CO. (BIRKENHEAD), LTD., 3 and 5, Canning Street, Birkenhead. To acquire the business of fertiliser and chemical manufacturer carried on by Alice E. Garner as the "British Fertilizer Co." Capital, £1,000 in £1 shares.

H. AND H. OIL SYNDICATE, LTD., Moorgate Station Chambers, London, E.C.2. To acquire any patent or process for purifying or separating mineral vegetable or other oils, and to carry on the business of refiners, producers, etc., of vegetable and petroleum oils and their products. Capital, £4,000 in £1 shares.

JULES LANG (OPTICAL) CO., LTD., Charlton Works, Charlton Place, Islington, London, N.1. To acquire the business in scientific glassware, etc., carried on by Fernand Rene Lang as a branch and under the style of Jules Lang and Son. Capital, £2,000 in £1 shares.

MIRIFIQUE, LTD. Manufacturers, importers, etc., of asphalte, bitumen and waterproof materials, wholesale manufacturing, research and analytical chemists, dyers and bleachers, etc. Capital, £5,000 in £1 shares. Solicitors: Freeman, Haynes and Co., 11, Gt. James Street, Bedford Row, London, W.C.1.

OCEAN HARVEST, LTD. Registered as a private company by H. G. Rushton, Lever House, Blackfriars, London, E.C.4, to deal in all kinds of sea products, and manufacture and deal in oils and fats, fish oils, glue, gelatin, etc. Capital, £1,000 in £1 shares.

### Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

CHEMICALS, PERFUMES, DRUGS, ETC., FOR AUSTRIA.—An agent in Vienna desires to secure the representation, on a commission basis, of British exporters of the above commodities. (Reference No. 218.)

CENTRIFUGAL PUMPS REQUIRED.—H.M. Trade Commissioner at Toronto has reported a call for tenders by the City of Toronto for the supply and delivery of one 40-million Imperial gallon centrifugal pump and electric motor, or two 20-million Imperial gallon centrifugal pumps and electric motor. Tenders must be presented before noon on Tuesday, September 16. British firms desirous of receiving further particulars regarding this call for tenders should apply to the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1. (Reference No. A.X./1249.)

SULPHATE OF COPPER FOR FRANCE.—An agent, established at Nantes (Loire-Inf.), wishes to obtain the representation of British firms, on a commission basis, for the sale in France of sulphate of copper. (Reference No. 193.)

### Tariff Changes

AUSTRALIA.—A dumping duty has been imposed on Brimsdown white lead from Great Britain. The notice applying a dumping duty to British hyposulphite of soda has been revoked.

HUNGARY.—An import licence is no longer necessary in the case of numerous products, including liquefied carbonic acid, sal ammoniac, liquid ammonia, Glauber salts (sulphate of soda), soda crystals, bisulphide of sodium in aqueous solution, yeast and other wine lees and compressed yeast, gold sulphate, gold sulphate carmine, natural organic colours, indigo substitutes, and indigo preparations, ultramarine.

SPAIN.—The duty on olive oil exported from Spain has been increased from 10 to 20 pesetas per 100 kilogrammes for August.

VENEZUELA.—A new Customs Tariff came into force on July 8.

